

THE SPECTRUM SOFTWARE LIBRARY

60 GAMES AND APPLICATIONS FOR THE ZX SPECTRUM

by David Harwood

60 complete
programs

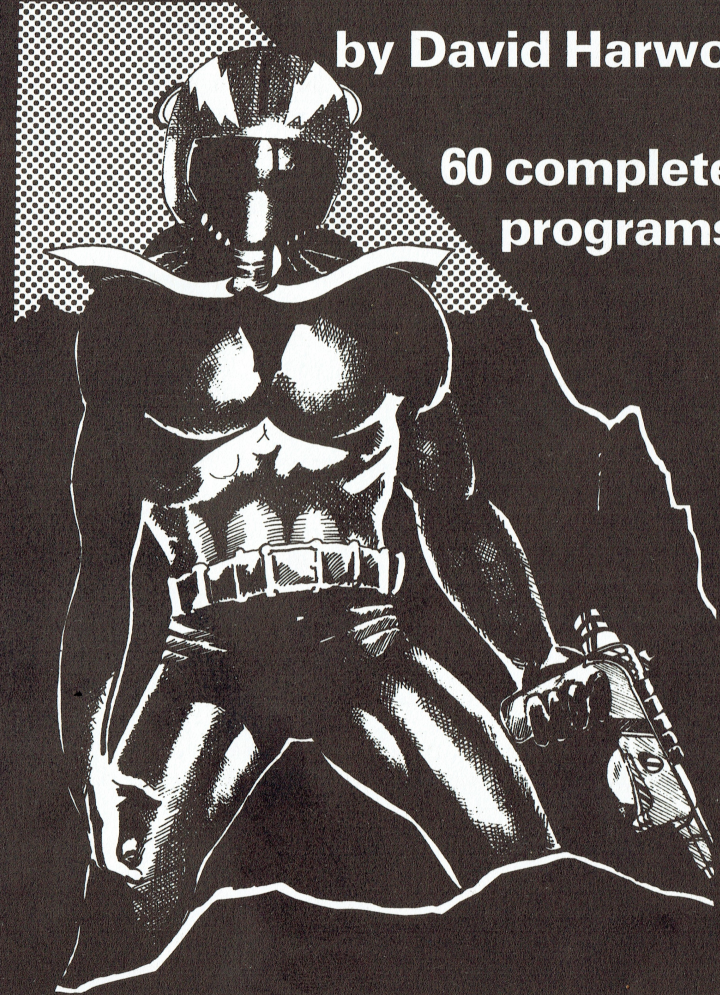


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INTRODUCTION

With this book, and your ZX Spectrum, you're set for a great adventure — or a number of them. The Spectrum, despite its small size, is a computer of quite immense power . . . and this book contains a host of programs to show you just how great that power is, and how flexible your new computer can be.

We've got a wide range of games, from DRAGON'S GOLD (old time adventure) to BETWEEN THE STARS (future time exploration); from BREAKOUT to MUSIC; from ZOMBIES to JACKPOT. The programs all contain ideas which you can adapt and use to enhance your own programs.

But the book is not all games, because we feel you won't want to spend all your life playing. Although games are great fun, and are one of the things that have made computers as popular as they are, many games do not even hint at the enormous potential of the computer. To show how sophisticated a computing machine you have, we have included a range of programs to help you in your day-to-day life. The utility programs will, by themselves, justify the purchase of your Spectrum. If you wish to plot graphs or solve equations, there are programs to help you. Metric conversion, alphabetical and numerical sorting, morse code training, BASIC renumbering — it's all here, in ready-to-run form. And, if you want to keep an eye on your cheque account, we've even got a program to do this for you.

It's time now to plug in your Spectrum and get down to business.

We would like to acknowledge original ideas and programs from the following:

Roger Macintyre, D. C. Owen, Martin Frobisher, Paul Toland, Stuart Roberts, Tim Rogers, I. S. Howson, Andrew Lovering, R. Stubbs, John Knight, Said Hassan, Jeremy Ruston, Paul Stevens, J. Elliot, M. Charlton, K. Mahogany, Daniel King and Tim Hartnell.

Happy programming,
David Harwood.

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BETWEEN THE STARS

You have been given the responsibility for the security of a cube of space, measuring 10 X 10 X 10. The Terran Federation, sparing no expense in the defense of earth, have provided you with a space ship equipped with a Spectrum as its on-board computer. Now it is your turn to guard the space lanes.

When you run the program, you will see your position within the cube is given by three co-ordinates under the line 'Ship is cruising at the co-ordinates:'.

The first co-ordinate is your position North/South (with lower numbers to the South), the second is your position across the cube, i.e. East/West, and the third is your position within the cube (forward/back). You can see that the ability to visualise in three-dimensions will be useful.

The alien craft is moving very slowly within the cube, but although you know at all times its direction from you, you do not know how far away it is. You have to hit it as many times as you can before the time counter hits zero, and without colliding with the alien craft. Running out of energy will also terminate the game. You will know when you are close enough to fire when the computer reports that the alien ship is firing at you. Every hit decrements your energy supply rather drastically.

The game is simple to play. You just press the key which refers to the direction you want to move:

'N', 'S', 'E' or 'W' to move North, South, East or West, 'A' to advance, 'R' to retreat and 'L' to fire your laser at the alien ship. If, for example, you knew the ship was to the North, you could just hold down the 'N' key until you moved onto the same North/South path as the ship, then test for proximity by firing.

You'll find that the program will teach you how to play the game. Just keep in mind that you have to get as close as

possible to the alien ship to fire, and that your task is to get as many of your 'tally' as possible before the game ends.

```

10 REM Between the stars
20 REM By Roger Macintyre
25 BORDER RND*7: PAPER 7: CLS
30 GO SUB 1070
40 GO SUB 800
50 IF L<0 THEN GO TO 500
80 PRINT AT 17,0; INK RND*6;"E
nter your command"
90 PRINT AT 18,2; INK RND*6; F
LASH 1;"N,S,E,W,(L)aser,""(A)dv
ance,(R)etreat"
100 LET L=L-.25
120 IF INKEY$="" THEN GO TO 120
125 BEEP .1,RND*20
130 IF INKEY$="L" THEN GO SUB 3
20
140 LET X=X+(INKEY$="S")-(INKEY
$="N")
150 LET Y=Y+(INKEY$="E")-(INKEY
$="W")
160 LET Z=Z-(INKEY$="A")+(INKEY
$="R")
195 PRINT AT 5,0;t$;t$
200 GO SUB 620
210 IF RND>.5 THEN GO TO 40
240 LET A=A+INT ((RND*3)-(RND*3
))
250 IF A<1 THEN LET A=1: IF A>1
0 THEN LET A=10
260 LET B=B+INT ((RND*3)-(RND*3
))
265 IF B<1 THEN LET B=1: IF B>1
0 THEN LET B=10
270 IF RND>.5 THEN GO TO 40
280 LET C=C+INT ((RND*3)-(RND*3
))
290 IF C<1 THEN LET C=1: IF C>1
0 THEN LET C=10
310 GO TO 40
320 REM **Fire Laser
330 LET L=L-.75
480 LET T=T+1
482 PAUSE 100
485 PRINT AT 1,0;t$
490 RETURN
500 CLS : BORDER RND*6: PRINT
TAB 3; INK RND*6; FLASH 1;"■ TER
MINATION"
530 IF T1<=0 THEN PRINT INK RND
*6;"We have been in space too lo
ng"
540 IF L>0 THEN PRINT INK RND*6
;"■ We have ben defeated"

```

```

555 PRINT AT 10,0; INK RND*6;"E
nergy left=";L;" ergs"
560 IF L<=0 THEN PRINT INK RND*
6; FLASH 1;"■ Energy Banks
Empty"
570 STOP
580 CLS : PRINT : INK RND*6;"We
have collided with the";TAB 8;"
ALIEN SHIP"
610 STOP
620 REM **Aliens Shoot**
630 IF ABS (A-X)>3 OR ABS (B-Y)
>3 OR ABS (C-Z)>3 THEN RETURN
650 IF RND>.75 THEN RETURN
660 BEEP .3,RND*20: PRINT AT 1,
0; INK RND*6; FLASH 1;"■■■■■■ AL
IENS FIRING AT US ■■■■■■"
670 PAUSE 100
690 PRINT AT 1,0;t$
700 IF RND>.7 THEN GO TO 770
710 BEEP .3,RND*20: PRINT AT 1,
0; INK RND*6; FLASH 1;"■ ALIEN F
IRE HAS HIT US ■"
720 LET L=L-7
730 IF L<=0 THEN GO TO 500
740 PAUSE 100
755 PRINT AT 1,0;t$
760 RETURN
770 BEEP .3,RND*20: PRINT AT 1,
0; INK RND*6; FLASH 1;"■■■■■■ ALI
EN FIRE MISSED ■■■■■■"
780 PAUSE 100
792 PRINT AT 1,0;t$
795 RETURN
800 REM **Print Out**
810 BORDER RND*6
850 PRINT AT 10,0;"Energy left=
";L;" ergs"
870 LET T1=T1-1: IF T1=0 THEN G
O TO 500
890 PRINT AT 19,20;"Time: ";T1;
"
900 IF L<3 THEN PRINT AT 12,4;
FLASH 1;"■■■■ ENERGY LOW ■■■■"
920 PRINT AT 20,19;"Tally: ";T
930 PRINT AT 14,0;"■ Ship is cr
uising at the"" co-ordinates:"
935 PRINT TAB 4;X;" ";Y;" ";Z
940 IF A=X AND B=Y AND C=Z THEN
GO TO 580
960 PRINT AT 5,0;"■";AT 5,0;"■
";AT 5,0;"■"
965 PRINT AT 5,0;"Alien craft i
s"
970 IF A<>X OR B<>Y THEN PRINT
"to the ";
980 IF A<X THEN PRINT "North";
990 IF A>X THEN PRINT "South";
1000 IF B>Y THEN PRINT "East";

```



```

1010 IF b<y THEN PRINT "West";
1020 IF c=z THEN PRINT " of us"
1030 IF c>z THEN PRINT " behind
us"
1040 IF c<z THEN PRINT " in fron
t of us"
1060 RETURN
1070 REM **Initialise**
1090 LET l=25+INT (RND*30): LET
t=0: LET t1=35
1140 LET a=INT (RND*10)+1: LET b
=INT (RND*10)+1
1150 LET c=INT (RND*10)+1: LET x
=INT (RND*10)+1
1160 LET y=INT (RND*10)+1: LET z
=INT (RND*10)+1
1180 LET t$=""
1210 RETURN

```

FASTERMIND

This version of the game 'Mastermind' (a registered trademark of Invicta) uses the letters 'A','B','C','D','E' and 'F'. It chooses four letters (and letters may be repeated within the code) and you have to try and guess the code in as few a number of tries as possible. As you will see when you run the program, a correct letter in the wrong position will give you a '+', while a correct letter in the correct position gives a '*'.

Invalid guesses are rejected. FASTERMIND was written by D. C. Owen.

```

80 REM fastermind
90 REM By D C Owen
95 BORDER RND*7: INK RND*6: CL
S
100 LET l=0: DIM a(4): DIM b(4)
130 FOR z=1 TO 4
140 LET b(z)=INT (RND*6)+1
150 NEXT z
160 POKE 23692,-1
170 PRINT AT 21,0:"Fastermind a
b c d e f";AT 21,0: OVER 1;"____
180 LET l=l+1
185 PRINT "Enter guess number
";l
190 INPUT LINE a$

```

```

195 LET k=0: LET j=0
200 FOR z=1 TO 4
210 LET a(z)=CODE a$-96
220 IF a(z)>6 THEN GO TO 185
230 PRINT CHR$(a(z)+96);"";
235 LET b(z)=ABS b(z)
240 IF a(z)<>b(z) THEN GO TO 26
0
250 LET k=k+1: LET a(z)=0: LET
b(z)=-b(z)
260 LET a$=a$(2 TO )
290 NEXT z
300 FOR h=1 TO 4: FOR z=1 TO 4
310 IF a(h)<>b(z) THEN GO TO 36
0
330 LET j=j+1: LET b(z)=-b(z)
350 GO TO 370
360 NEXT z
370 NEXT h
400 PRINT TAB 10; INVERSE 1;"Sc
ored ";
410 IF k=0 THEN GO TO 450
420 FOR z=1 TO k
430 BEEP .2,RND*20: PRINT FLASH
1: INK RND*6;"*"; FLASH 0;" ";
440 NEXT z
450 IF j=0 THEN GO TO 490
470 BEEP .2,RND*20: PRINT FLASH
1: INK RND*6;"+"; FLASH 0;" ";
480 NEXT z
490 IF k<4 THEN GO TO 180
500 PRINT " PAPER RND*6; INK 9
; FLASH 1;"!!!!!!!!!!!!!!YOU DID IT!
!!!!!!!!!!!!"

```

Fastermind a b c d e f

```

Enter guess number 1
a b c d   Scored * +
Enter guess number 2
a b d e   Scored * * *
Enter guess number 3
a b d a   Scored * * +
Enter guess number 4
a b b e   Scored * *
Enter guess number 5
a b d d   Scored * *
Enter guess number 6

```


TRAILER

TRAILER is based on the arcade game SNAKE, where you move about the screen, not bumping into your trail. In TRAILER you have three lives, and your score and men left are printed on the top line. When you run the program you are asked to choose your speed 0-10, where 0 is fast, 10 is slow. You control your direction using the keys '5', '6', '7' and '8'.

```

1 REM Trailer by D Harwood
4 REM *define character--run
  lines 5-7 before typing in rest
  of program
5 FOR t=1 TO 7: READ n
6 POKE USR "k"+t,n: NEXT t
7 DATA 60,126,219,219,255,255
,102,0
8 REM to get @ type in 'k' in
  graphics mode
9 LET p$=" @ @ @"
10 LET s=0: LET c=3
11 BORDER 7: PAPER 7: INK 0: C
  LS
12 REM instructions
15 PRINT TAB 8; INK 1;"T ";; P
  AUSE 10: PRINT INK 2;"r ";; PAUS
  E 10: PRINT INK 3;"a ";; PAUSE 1
  0
20 PRINT INK 4;"i ";; PAUSE 10
: PRINT INK 1;"l ";; PAUSE 10: P
  RINT INK 2;"e ";; PAUSE 10: PRIN
  T INK 3;"r"
30 PRINT "This is a game of
  skill.You"
40 PRINT "must move your man a
  bout"
50 PRINT "the screen and not b
  ump into"
60 PRINT "your trail.You have
  three lives."
65 INPUT "Speed (0-10):" s
:10 slow "sp
70 PRINT INK 2; FLASH 1; AT
  10,10;"GOOD LUCK!"
80 PAUSE 300: CLS
85 PLOT 248,168: DRAW -241,0:
  DRAW 0,-161: DRAW 241,0: DRAW 0,
  160
90 LET a=11: LET b=16: LET a$=
  STR$ (INT (RAND*4)+5)
95 PRINT AT 0,20;p$
100 PRINT AT a,b;"@"
105 FOR z=1 TO sp*2: NEXT z

```

```

110 IF INKEY$<>"" THEN LET a$=I
  NKEY$
115 PRINT AT a,b;"*"
120 LET a=a+(a$="6")-(a$="7")
130 LET b=b+(a$="8")-(a$="5")
140 IF a=21 OR a=0 THEN LET a=A
  BS (a-20)
150 IF b=31 OR b=0 THEN LET b=A
  BS (b-30)
160 BEEP .01,RND*20
170 LET s=s+1: PRINT AT 0,0;"Sc
  ore: "s
180 IF SCREEN$ (a,b)="*" THEN G
  O TO 200
190 GO TO 100
200 CLS: PRINT PAPER 1; INK 7;
  FLASH 1; AT 11,0;"!!!!!!
  BANG!!!!!!"
210 LET c=c-1
220 IF c=0 THEN GO TO 270
230 LET p$="": FOR i=1 TO c: LE
  T p$=p$+"@" : NEXT i
240 PRINT "Only ";c;" men lef
  t"
250 PRINT "PREPARE YOURSELF"
260 GO TO 80
270 PRINT AT 13,8; FLASH 1;"GAM
  E TERMINATED"

```

SEA RAIDER

This program is more difficult to play than might be thought at first. In SEA RAIDER, you have to try and destroy a battleship by bombing it as you fly over in your 'plane. To make this more difficult, you fly twice as fast as the ship, and from time to time, are buffeted by winds, increasing your speed even more.

You have 20 bombs in this version of the game, but you can easily change this by altering the value assigned to M in line 110. You fire by pressing 'F'. You do not see anything fall from the 'plane, but if you hit it, it explodes and then is miraculously restored and continues on its tireless trip from left to right. There is a time limit of 300 seconds, and this decrements throughout the game. The game ends when you run out of bombs or time. The maximum score is 5340, but it is practically impossible to get this within the time.

The program demonstrates the excellent graphic capabilities of the Spectrum, actually printing a 'plane and a battleship. SEA RAIDER was written by Martin Frobisher.

```

1 REM sea Raider
2 REM by Martin Frobisher
10 REM type in this routine and
d run it before typing in rest o
f program
20 FOR a=1 TO 8: READ a$
30 FOR t=0 TO 7: READ b
40 POKE USA a$+t,b
50 NEXT t: NEXT a
60 DATA "a",135,195,227,255,25
5,17,35,71
65 DATA "s",0,128,192,255,254,
192,128,0
70 DATA "d",32,23,15,7,255,127
,63,31
75 DATA "f",31,159,159,159,255
,255,255,255
80 DATA "g",248,249,249,249,25
5,255,255,255
85 DATA "h",4,232,240,224,255,
254,252,248
90 DATA "j",0,0,0,1,1,7,7,7
95 DATA "k",0,0,0,128,128,224,
224,224
100 BORDER AND#6: PAPER AND#5+1
: INK 9: CLS
105 PLOT 0,39: DRAW 255,0
110 LET m=20: LET t=300: LET s=
0: LET a=1
120 LET b=INT (RND*15)+1
130 LET a=a+2: LET b=b+1
140 IF RND>.7 THEN LET a=a+1
150 IF a>26 THEN PRINT AT 5,a-3
: " " : LET a=3
160 IF b>26 THEN PRINT AT 15,b-
1: " " : AT 16,b-1: " " : LET
b=1
165 REM to get plane type in 'a
then 's' in graphics mode
170 PRINT AT 5,a-3: " "
180 LET t=t-1: PRINT AT 0,0: PA
PER 2;"Time=";t: " "
185 REM to get warship top type
in 'j' and 'k' in graphics mode
for bottom type in 'd','f','g'
and 'h' in graphics mode
190 PRINT AT 15,b-1: INK 0: "
: AT 16,b-1: " "
200 IF INKEY$="f" THEN GO TO 21
0
205 LET t=t-1: GO TO 130
210 LET m=m-1: PRINT AT 0,10: P
APER 2;"Missiles=";m: " "

```

```

220 IF ABS (a-b)>2 THEN GO TO 1
70
230 IF m=0 OR t<1 THEN STOP
240 FOR q=1 TO 7
250 BORDER AND#6: BEEP .02,-q:
BEEP .02,q
260 PRINT AT 15,b-1: INK 0: "
: AT 16,b-1: " " : AT 15,b-1:
INK 7: " " : AT 16,b-1: " "
270 NEXT q
280 LET s=s+267
290 PRINT AT 1,6: PAPER 2;"Scor
e=";s: " "
300 IF INKEY$<>" " THEN GO TO 26
5
310 GO TO 170

```

Time=252 Missiles=19
Score=267



PROTECTOR

In this program, you are given the task of protecting a defective part of the green forcefield guarding Earth. Certain aliens have also detected the weak spot in our defences, and are trying to break through the field.

The forcefield can stand one attack on any part, but this weakens that part. Any weak section which receives a second hit causes the collapse of the field and so leaves Earth defenceless. The field will also collapse under the strain of having more than nine weak spots along its length.

Your task is to block the attacks with your craft. You can restore any weakened part of the field directly below you by pressing 'F'. The '5' and '8' keys control your motion, moving in the direction of the arrows on those keys.

There are five skill levels, with one being the easiest. Since the first few levels are really only for practice, you score more points towards the higher and harder levels.

Failure, I'm afraid to say, is inevitable, because the aliens continually speed up their attacks if the preceding attacks fail. Your score is given at the end of the game. PROTECTOR was written by Paul Toland.

```

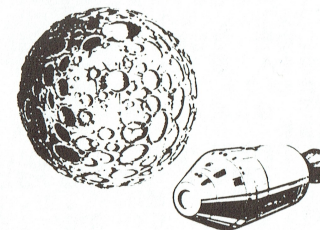
1 FOR a=1 TO 4: READ a#
2 FOR t=0 TO 7: READ b
3 POKE USR a#+t,b
4 NEXT t: NEXT a
5 DATA "a",255,0,255,0,255,0,
255,0
6 DATA "s",0,0,0,0,255,0,255,
0
7 DATA "d",0,0,0,0,60,60,60,6
0
8 DATA "f",255,255,195,195,19
5,195,195,195
9 REM to get ≡ type in 'a' in
graphics mode
10 CLS: LET d$=""
=====
20 PRINT AT 19,3: INK 4;"≡";TA
B 07;"≡"
30 PRINT AT 0,10: PAPER 2: INK
9: FLASH 1;"Protector"

```

```

40 PRINT AT 20,5: INK RND*6: F
LASH 1;"Enter skill level 1-5"
50 IF INKEY$="" OR INKEY$<"0"
OR INKEY$>"5" THEN GO TO 50
60 LET s=VAL INKEY$*2-1
70 LET b=16: LET v=1: LET w=0
80 FOR i=1 TO 20
90 LET a=INT (RND*23)+4
100 FOR h=s TO 19 STEP v
105 REM to get # type in 'd' in
graphics mode
110 PRINT AT 20,1: INK 4;d$:AT
h,a: INK RND*6;"#":AT 19,b;"#
120 LET b=b+(INKEY$="8")-(INKEY
$="5")
130 LET b=b+(b=3)-(b=27)
135 REM to get □ type in 'f' in
graphics mode
140 PRINT AT 19,b;"□"
150 IF INKEY$<>"f" OR d$(b)="≡"
THEN GO TO 170
160 LET w=w-1: LET d$(b)="≡": B
EEP .01,RND*20+10
170 PRINT AT h,a;" "
180 NEXT h
190 IF b=a THEN GO TO 220
195 REM to get = type in 's' in
graphics mode
200 IF d$(a)="=" OR w=9 THEN GO
TO 240
210 LET w=w+1: LET d$(a)="=": B
EEP .0102,RND*20
220 NEXT i
230 LET v=v*2: GO TO 80
240 PRINT AT 5,1: INK RND*6;"Yo
u failed ";: BEEP 1,RND*20
250 PRINT INK RND*6;"- the forc
e field is broken after ";: BEEP
2,RND*20: PRINT INK RND*6;((v-1
)*20+1)*s;" was scored"
260 PRINT INK RND*6: FLASH 1;"
Do you want to try to protect
another planet?"
270 IF INKEY$="" THEN GO TO 270
280 IF INKEY$<>"n" THEN RUN
290 STOP

```



LETTER CHASER

Let your ball roll around the screen, to run over the letters you see in alphabetical order. You enter the speed setting of the game ('1'-Fast and '2'-Slow) and then use the cursor control keys (keys '5' to '8') to move around. The game ends if you hit a letter out of sequence, indicating what the next letter should have been. This game is very addictive, and you'll probably find yourself keeping on trying to complete it successfully. LETTER CHASER was written by Paul Toland.

```

1 FOR t=0 TO 7: READ z
2 POKE USR "a"+t,z: NEXT t
3 DATA 0,60,126,126,126,126,6
0,0
10 LET x=1: LET y=1: LET a=1
20 LET d=0: LET nc=65
30 LET p=RND*7: PAPER p: BORDE
R p: INK 9: CLS
40 INPUT FLASH 1;"Enter speed
setting (1-FAST 2-SLOW) ";s
50 PRINT FLASH 1;"LETTER CHASER"
60 FOR t=1 TO 20
70 PRINT FLASH 1;"■";AT t,31;"
80 NEXT t
90 PRINT FLASH 1;"LETTER CHASER"
110 FOR i=65 TO 90
120 LET cx=INT (RND*30)+1: LET
cy=INT (RND*19)+2
130 PRINT AT cy,cx;CHR$ i
140 NEXT i
150 LET i$=INKEY$
160 LET a=(i$="6")-(i$="5")+(i$
="")*a
170 LET d=(i$="6")-(i$="7")+(i$
="")*d
180 PRINT AT y,x;" "
190 LET x=x+a: LET y=y+d
195 LET x=x+(x=0)-(x=31): LET y
=y+(y=0)-(y=21)
200 LET n=CODE SCREEN$ (y,x)
205 REM to get ● type in 'a' in
graphics mode
210 PRINT AT y,x;"●"
220 PAUSE 3*s
230 IF n=32 THEN GO TO 150
240 IF n<>nc THEN GO TO 320
250 LET nc=nc+1: BEEP .1,nc-65
260 IF nc<91 THEN GO TO 150
270 FOR i=1 TO 8

```

```

280 BEEP .1,1: BEEP .1,8-i
290 NEXT i
300 PRINT AT 10,10; FLASH 1;"YO
U MADE IT"
310 GO TO 330
320 PRINT AT 10,10; FLASH 1;CHR
$ (nc);"-HARD LUCK"
330 INPUT FLASH 1;"Try again??"
a$
340 IF a$<>"n" THEN RUN
350 PAPER 7: BORDER 7

```

DRAGON'S GOLD

The aim of DRAGON'S GOLD is to accumulate as much gold as possible, while wandering through a complex maze of tunnels, caves and doors and trying to avoid the dragon and mineshafts. You enter 'A' to move ahead, 'L' to move left, or 'R' to move right. Entering a space before enter will result in the game stopping. If your fate ends up with the dragon or down a mineshaft, the computer will play a little tune for you before the game ends. DRAGON'S GOLD was written by D. C. Owen.

```

1 REM Dragon's gold
2 REM by D C Owen
3 RANDOMIZE : LET g=0
10 BORDER RND*6: INK RND*5: CL
S
15 POKE 23692,-1
20 PRINT FLASH 1;"AT 21,8;"DR
AGON'S GOLD";AT 21,8; OVER 1;"
30 PRINT "You have: -"g;" bl
ocks of gold"
40 PRINT "Ahead of you is a";
: GO SUB 1000
60 LET b$=a$
70 PRINT "On the left is a";
: GO SUB 1000
80 LET c$=a$
85 PRINT "And on the right is
a";: GO SUB 1000
95 LET r$=a$
90 PRINT FLASH 1;"Which way
do you want to go?"
100 PRINT FLASH 1;"A-ahead"
"L-left" "R-right"
110 INPUT k$

```



```

120 IF k$="a" AND b$="D" OR k$=
"r" AND r$="D" THEN GO SUB 2000
130 IF k$="a" AND b$="T" OR k$=
"l" AND l$="T" OR k$="r" AND r$=
"T" THEN GO SUB 3000
140 IF k$="a" AND b$="C" OR k$=
"l" AND l$="C" OR k$="r" AND r$=
"C" THEN GO SUB 4000
150 IF NOT (k$="l" OR k$="r" OR
k$="a") THEN GO TO 90
160 GO TO 15
999 BORDER 7: PAPER 7
1000 RESTORE
1010 FOR t=1 TO INT (RND*3)+1
1020 READ a$
1030 NEXT t
1040 PRINT INK RND*6; a$: LET a$=
a$(2)
1050 DATA " Door", " Tunnel", " Ca
ve"
1060 RETURN
2000 REM ** DOOR **
2010 GO TO 2000+INT (RND*4+1)*10
2100 PRINT "It is locked. Move
on.": RETURN
2200 LET q=INT (RND*9+1)*100
2210 PRINT "It will open. There
are ";q;" gold bloc
ks in here."
2220 LET g=g+q: RETURN
2300 PRINT "There is a lake her
e. You cannot see the far
side."
2310 PRINT "Are you going to try
and cross it?"
2320 INPUT c$
2325 CLS
2330 IF c$(1)<>"y" THEN RETURN
2340 LET k=INT (RND*3)+1
2350 IF k=2 THEN PRINT "You have
escaped with ";q;" blocks" "of
gold.": GO TO 2370
2360 PRINT AT 10,4; FLASH 1;"Unf
ortunately, you have"
2370 PRINT AT 11,9; INK 2; FLASH
1;"...DROWNED!!!": GO TO 5000
2400 LET k=INT (RND*9)+1*50
2410 PRINT "This room contains
a "; INK 2; FLASH 1;"DRAGON."
2420 PRINT "It demands ";k;" gol
d blocks" "or it will eat you."
2425 PAUSE 200: POKE 23692,-1
2430 FOR J=1 TO 20
2435 BEEP .2,J
2440 PRINT INK RND*6; TAB J;"STAN
D BY"
2450 NEXT J

```

```

2460 IF g>k-1 THEN PRINT "You ha
ve enough.": LET g=g-k: PAUSE 10
0: RETURN
2470 PRINT FLASH 1; INK 2;"...BU
T you haven't got enough...so BY
E BYE.": GO TO 5000
3000 REM ** TUNNEL **
3010 IF RND>.85 THEN RETURN
3020 PRINT "You have escaped wi
th ";g;"Gold blocks": STOP
4000 REM ** CAVE **
4010 GO TO 4000+INT (RND*3+1)*10
0
4020 PRINT "The cave is empty. M
ove on.": RETURN
4200 LET q=INT (RND*10+1)*100
4210 PRINT "There are ";q;" gol
d blocks"
4220 PRINT "here to add to your
store."
4230 LET g=g+q: RETURN
4300 IF RND>.9 THEN GO TO 4400
4305 POKE 23692,-1
4310 FOR h=1 TO 24: PRINT : NEXT
h
4320 PRINT INK 2; FLASH 1;"OH NO
!"
4330 FOR J=1 TO 15
4335 BEEP .2,J
4340 PRINT TAB 2*J; INK RND*5;"■
"
4350 NEXT J
4360 PRINT INK 2; FLASH 1;"It is
a mineshaft...you are dea
d.": GO TO 5000
4400 PRINT "There are noises ah
ead"
4410 PRINT "Do you want to inves
tigate?"
4420 INPUT k$
4430 IF k$(1)<>"y" THEN RETURN
4440 GO TO 4000
5000 RESTORE 5020
5005 FOR a=1 TO 10
5010 READ b,c: BEEP b,c
5015 NEXT a
5020 DATA 1,0,1,0,.5,2,.5,0,.5,3
,.5,0,.5,-1,.5,0,.5,1,1,0

```


TILE CRAZY

Ken Mahogany's TILE CRAZY puts you in command of a four by four grid, which holds the letters of the alphabet. You have to attempt to arrange them in alphabetical order as follows:

```
A B C D
E F G H
I J K L
M N O
```

... with a space in the bottom right corner. You move by entering a number (there is a code beside the printout) of the letter you wish to move, then the square into which you wish to move it. You will not be allowed to cheat. The program counts how many moves you make. You should be able to do it in 40 or so moves. If you wish to change the order of the letters at the start of the game, alter the values in the DATA statement of line 420.

```
10 REM Tile Crazy
20 REM © K Mahogany, 1982
30 GO SUB 330
40 GO SUB 200
50 GO SUB 200
90 INPUT INK 7;"Which one to move? ";x
110 IF a(x)=32 THEN GO TO 90
130 INPUT INK 7;"To where? ";y
140 IF a(y)<>32 THEN GO TO 130
150 LET a(y)=a(x)
160 LET a(x)=32
170 LET go=go+1
180 GO TO 50
200 REM *** Print out ***
210 PRINT AT 0,3; PAPER 7; INK 3;"Go number "; INK 2;go
220 PRINT "  " INK RND*4;CHR$ a(1);CHR$ a(2);CHR$ a(3);CHR$ a(4);
    " 1 2 3 4"
230 PRINT INK RND*4;CHR$ a(5);CHR$ a(6);CHR$ a(7);CHR$ a(8);
    " 5 6 7 8"
240 PRINT INK RND*4;CHR$ a(9);CHR$ a(10);CHR$ a(11);CHR$ a(12);
    " 9 10 11 12"
```

```
250 PRINT INK RND*4;CHR$ a(13);CHR$ a(14);CHR$ a(15);CHR$ a(16);
    " 13 14 15 16"
320 RETURN
330 REM ***Initialise***
340 DIM a(16)
350 FOR b=1 TO 16
360 READ m
370 LET a(b)=m+64
380 NEXT b
390 LET go=1
400 PAPER 6: BORDER 2
405 CLS
410 RETURN
420 DATA 9,14,5,2,11,6,1,4,12,7,
    -32,10,13,8,3,15
```

SPECTRAL HANGMAN

This is a fairly straightforward game in which the computer chooses a word from its vocabulary, and then gives you a limited number of guesses (based on the length of the word) to get it right. The vocabulary can easily be changed or extended. SPECTRAL HANGMAN was written by Ken Mahogany.

```
10 REM Spectral Hangman
20 REM © K Mahogany, 1982
30 FOR g=1 TO RND*25+1
40 READ a$
50 NEXT g
60 LET n=LEN a$
70 DIM b(n); DIM d(n)
80 FOR g=1 TO n
90 LET b(g)=CODE a$(g)
100 LET d(g)=b(g)
110 NEXT g
120 FOR j=1 TO n+n/3
140 GO SUB 410
150 IF h=n THEN GO TO 300
190 PRINT "  " INK RND*6;"Enter your guess no. ";j
200 INPUT c$
210 LET f=CODE c$
220 FOR g=1 TO n
230 IF d(g)=f THEN LET d(g)=0
```



```

240 NEXT g
250 NEXT j
265 GO SUB 410
270 PRINT " INK 3; "Sorry, time
    is up!"
280 GO TO 330
300 REM ***Win***
310 PRINT " INK 4; TAB 4; "Well d
    one!"
320 PRINT " INK 4; TAB 4; "You go
    t the word in "j-1;" guesses"
330 PRINT " INK 2; "The word was
    "a$
335 PRINT " INK RND*5; "Press a
    ny key for a new game"
340 PAUSE 4e4
350 RUN
360 DATA "feature", "spectrum", "
    cambridge", "hazard", "pumpkin"
370 DATA "question", "quiz", "fac
    e", "uncle", "recorder"
380 DATA "basic", "formula", "fri
    endly", "resource", "better"
390 DATA "butter", "strawberry",
    "bothersome", "atom", "sorcerer"
400 DATA "wizard", "wickedly", "e
    nvoy", "wanton", "wanderer"
410 LET h=0
415 FOR e=1 TO n
420 IF b(e)=d(e) THEN PRINT INK
    RND*6; "-";
430 IF b(e)<>d(e) THEN PRINT IN
    K RND*6; CHR$(b(e));: LET h=h+1;
    BEEP .25,h
440 NEXT e
450 BORDER RND*6
460 PRINT " INK 0; PAPER 6; "You
    have guessed "; INK RND*5; h; IN
    K 0; " letter";
470 IF h<>1 THEN PRINT PAPER 6;
    "s"
480 PRINT
490 RETURN

```

REACTION

This program tests your reflexes. The computer prints a letter or number at a random position on the screen. You have to immediately type this in. You start with 5 points and gain them if you type in the letter correctly, or lose them if you are too slow or type in the wrong letter. This may seem easy, especially as there is a speed control, but the computer does not clear away any letters, so you have to try and remember which letters have already been printed on the screen. The game stops if you run out of points.

```

1 REM reaction by D Harwood
2 LET l=5
10 PRINT TAB 10; INK RND*5; FL
    ASH 1; "REACTION"
20 PRINT " "I will print a cha
    racter on the screen and you mus
    t immediately type this in."
30 PRINT " "If you get it wron
    g I will give you another chance
    , but you only start with 5
    points"
40 PRINT " "I will take 2 poin
    ts off if you are not quick enou
    gh"
45 INPUT "Speed (1-10) ?"; t
50 PRINT " INK 2; FLASH 1; "HO
    PE YOU ARE READY"
60 PAUSE 200
70 CLS : POKE 23562, -1
75 PRINT AT 0,0; INK 1; FLASH
    1; "REACTION REACTION REACTION
    "
76 PRINT AT 2,0; INK 2; FLASH
    1; "Score "; l
77 IF l<1 THEN GO TO 230
80 LET a=INT (RND*26)+96
90 IF RND>.7 THEN LET a=INT (R
    ND*9)+48
100 LET x=RND*18+3: LET y=RND*3
    1
105 BEEP .1,0: PRINT AT x,y; IN
    K RND*5; FLASH 1; CHR$ a
110 PAUSE t*7
120 LET a$=INKEY$
125 IF a$="" THEN GO TO 210
130 IF CODE a$=a THEN GO TO 170
140 PRINT AT 0,0; INK 2; FLASH
    1; "Wrong, You have lost one point
    "
150 PAUSE RND*200
160 LET l=l-1: GO TO 75

```



```

170 PRINT AT 0,0; INK 2; FLASH
1;" WELL DONE
180 LET l=l+1
190 FOR t=1 TO 10: BEEP .1,t: N
EXT t
200 GO TO 75
210 PRINT AT 0,0; INK 3; FLASH
1;" FAR TOO SLOW
215 PAUSE RND*200
220 LET l=l-2: GO TO 75
230 CLS : PRINT AT 10,8; INK AN
D*5; FLASH 1;"Run out of points.
..BYE"
240 BEEP 1,-2: BEEP 2,4

```

POETRY

This program turns your Spectrum into a William Shakespeare... almost. Choosing words at random from the DATA statement, and spacing them out using the lines 40-60, the program manages to join phrases together surprisingly well. The phrases are printed on the screen in different colours and some are made to stand out using the BRIGHT command. POETRY was written by Tim Hartnell.

```

5 RANDOMIZE
10 REM Poetry
20 POKE 23692,-1
30 IF RND>.7 THEN GO TO 70
40 FOR j=1 TO RND*3
50 PRINT
60 NEXT j
70 LET a$=""
75 RESTORE
80 FOR a=1 TO RND*12
90 READ b$
100 NEXT a
110 LET x=LEN a$: LET y=LEN b$
120 IF a$(x-1)=b$(y-1) THEN GO
TO 75
130 IF x+y>=32 THEN GO TO 160
140 LET a$=a$+b$
150 GO TO 75
160 PRINT INK RND*5; BRIGHT (AN
D*.8);a$
170 GO TO 10
200 DATA "detached ","initiate
","early ","although ","
210 DATA "disciple ","weeping "
","only ","reached out for"
220 DATA "lonely ","yearns for
","then "

```

NOUGHTS AND CROSSES

I guess there is no need to tell you how to play this game.

You and the computer take it in turns, trying to get three Os or three Xs in a row. Unlike many computer versions of the game, this program allows you to win now and then! Most computer NOUGHTS AND CROSSES are unbeatable, with a draw being the best you can do.

You move by entering the number of the square into which you want to move. You enter your move first, but the computer will ignore you if you do not enter 5 (the centre square) as your first move.

This version of the game is capable of handling over 40,000 developments of NOUGHTS AND CROSSES, about an eighth of the possible games which can occur.

```

1 REM Noughts and crosses
2 REM adapted T Hartnell and
D Harwood
3 REM from ZX80 program
4 REM by Stuart Roberts
10 DIM b(9): DIM p(9)
20 FOR a=1 TO 9
30 LET b(a)=a
40 NEXT a
50 LET e=0: LET q=0
60 LET n=0
70 LET x=4
80 PRINT AT 5,0;
90 FOR a=1 TO 9
100 IF a=x THEN LET x=x+3: PRIN
T ""
110 IF b(a)=0 THEN GO TO 320
120 IF b(a)=10 THEN GO TO 350
130 PRINT INK RND*6;b(a);"";
140 NEXT a
150 IF n=1 THEN GO TO 380
160 IF e=8 THEN PRINT "" INK 1;
FLASH 1;" I WIN ": GO TO 730
170 IF q=5 THEN PRINT "" INK 1;
FLASH 1;" IT'S A DRAW ": GO TO
730
180 INPUT "Your move ";z

```



```

190 IF b(z) <> z THEN GO TO 180
200 LET q=q+1
210 IF z=11 THEN LET b(5)=10: G
0 TO 60
220 LET n=1: LET b(z)=0
230 GO TO 70
240 FOR a=c TO d
250 IF b(a)=8 THEN LET b(a)=10
260 LET a=a+f
270 NEXT a
280 GO TO 60
290 IF b(5)=5 THEN GO TO 20
300 LET b(d)=10
310 GO TO 60
320 PRINT INK 1; FLASH 1;"0"; F
LASH 0;" ";
330 LET p(a)=1
340 GO TO 140
350 PRINT INK 2; FLASH 1;"X"; F
LASH 0;" ";
360 LET p(a)=4
370 GO TO 140
380 LET g=0
390 LET c=1: LET d=9: LET f=3
400 GO SUB 580
410 LET c=3: LET d=7: LET f=1
420 GO SUB 580
430 LET d=9: LET f=2
440 GO SUB 580
450 LET c=2: LET d=8
460 GO SUB 580
470 LET c=1: LET d=7
480 GO SUB 580
490 LET d=3: LET f=0
500 GO SUB 580
510 LET c=4: LET d=6
520 GO SUB 580
530 LET c=7: LET d=9
540 GO SUB 580
550 LET g=g+1
560 IF g=5 THEN GO TO 60
570 GO TO 390
580 LET e=0
590 FOR a=c TO d
600 LET e=e+p(a): LET a=a+f
610 NEXT a
620 IF e=3 THEN GO TO 720
630 IF g=0 THEN RETURN
640 IF e=8 THEN GO TO 240
650 IF g=1 THEN RETURN
660 IF e=2 THEN GO TO 240
670 IF g=2 THEN RETURN
680 IF e=5 THEN GO TO 240
690 IF g=0 THEN RETURN
700 IF e=1 OR e=4 THEN GO TO 29
0
710 RETURN

```

```

720 FOR a=1 TO 10: BEEP .1,a: B
EEP .1,10-a: NEXT a
725 PRINT INK 2; FLASH 1;" YOU
WIN "
730 BEEP .1,0: BEEP .2,0
735 INPUT FLASH 1;"Do you want
another game?";k$
740 IF k$(1) <> "n" THEN CLS : RU
N
750 PRINT ""OK, Thanks for pla
ying"

```

1 2 3	1 2 3	0 2 3
4 5 6	4 0 6	4 0 6
7 8 9	7 8 X	X 8 X
	0 X 3	0 X 3
	4 0 6	0 0 X
	X 0 X	X 0 X

MUSIC

This program simulates one octave of a piano keyboard, using defined characters for the piano keyboard. Run line 3 before typing in the rest of the program so you can get the defined characters immediately when you type the stated keys in graphics mode ('P' and 'I').

The keys "Q"-"P" represent the white keys on the piano and the keys '2', '3', '5', '6', '7', '9' and '0' represent the black keys. Pressing any of these keys will result in a note sounding. Change the length of the note by altering .3 in the BEEP statement line 105.

```

1 REM Music Maker by D Harwood
d
2 REM run lines 3-4 before
typing in rest of program
3 FOR n=0 TO 7: POKE USR "p"+
n,16: POKE USR "i"+n,252: NEXT n
4 LET p$="": LET n$="": LET p
=0: LET x=0
5 PAPER 0: INK 7: BORDER 0: C
LS

```



```

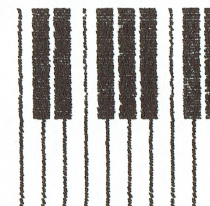
7 PRINT
10 FOR m=1 TO 5
15 REM to get | type in 'p' in
graphics mode---to get | type i
n 'i' in graphics mode
20 PRINT TAB 10;"|■■■■■■■■"
30 NEXT m
40 FOR m=1 TO 4
50 PRINT TAB 10;"|■■■■■■■■"
60 NEXT m
70 LET k$=INKEY$
80 IF k$="" THEN GO TO 70
85 IF p$=k$ THEN GO TO 100
90 GO SUB 1000
100 PRINT OVER 1;AT x,9+p;n$
105 BEEP .3,a
110 LET p$=k$
115 PRINT OVER 0;AT 0,10;"
      ",AT 9,10;"|■■■■■■■■"
) ) ) "
120 GO TO 70
1000 IF k$="1" THEN LET a=1: LET
p=2
1005 IF k$="2" THEN LET a=3: LET
p=3
1010 IF k$="4" THEN LET a=6: LET
p=5
1015 IF k$="5" THEN LET a=8: LET
p=6
1020 IF k$="6" THEN LET a=10: LE
T p=7
1025 IF k$="8" THEN LET a=13: LE
T p=9
1030 IF k$="9" THEN LET a=15: LE
T p=10
1035 IF k$="q" THEN LET a=-1: LE
T x=8: LET p=1
1040 IF k$="w" THEN LET a=0: LET
p=2
1045 IF k$="e" THEN LET a=2: LET
p=3
1050 IF k$="r" THEN LET a=4: LET
p=4
1055 IF k$="t" THEN LET a=5: LET
p=5
1060 IF k$="y" THEN LET a=7: LET
p=6
1065 IF k$="u" THEN LET a=9: LET
p=7
1070 IF k$="i" THEN LET a=11: LE
T p=8
1075 IF k$="o" THEN LET a=12: LE
T p=9
1080 IF k$="p" THEN LET a=14: LE
T p=10
1090 LET x=9: LET n$="■"

```

```

1100 IF k$="1" OR k$="2" OR k$="
4" OR k$="5" OR k$="6" OR k$="8"
OR k$="9" THEN LET x=0: LET n$=
"■"
1110 RETURN

```



BREAKOUT

In this version of BREAKOUT, you control the bat on the left-hand side of the screen using the '6' and '7' keys to move your bat trying to keep the ball in 'court!' The aim is to demolish as much of the three coloured walls as possible. Walls further back give higher scores. You are allowed 5 balls in each game. You need to type in LET H=0 before you run the program to set the high score counter, then start the program by entering GOTO 5, rather than RUN.

If you save the program after you have played it, then start running it with GOTO 5; the old high score will be there for the new game. The graphics, colour and sound used in this game make it very addictive.

```

1 REM run lines 2-4 before ty
ping in the rest of the program
2 FOR t=0 TO 7: READ z
3 POKE USR "a"+t,z: NEXT t
4 DATA 0,60,126,126,126,126,6
0,0
5 RANDOMIZE
10 LET t=0: LET z=0
20 LET tb=0: LET r=8
30 BORDER AND#7: INK 9: CLS
40 PRINT AT 1,0; INVERSE 1;"
BREAKOUT
50 PRINT AT 17,0; INVERSE 1;"
BREAKOUT
60 PRINT AT 18,0;"Score
Ball No. ";AT 18,0; OVER 1;"

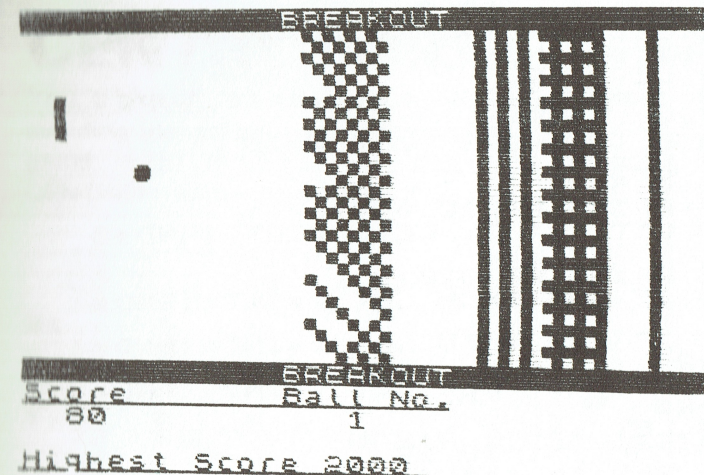
```



```

70 PRINT AT 21,0;"Highest Score
e ";h;AT 21,0; OVER 1;"
80 FOR i=2 TO 16
90 PRINT AT i,13; INK 3;"███"
; INK 0;" "; INK 4;"███"; INK
5;"███"; INK 0;" "; INK 6;"███"
100 NEXT i
110 LET a=-1: LET d=1: LET x=11
; LET y=INT (RND*10)+5
120 LET tb=tb+1
130 IF tb=6 THEN GO TO 310
140 PRINT AT 19,15;tb
150 PRINT AT r,1;" ";AT r+1,1;"
160 LET r=r+(INKEY$="6")-(INKEY
$="7")
165 IF r=1 THEN LET r=r+1
167 IF r=16 THEN LET r=r-1
170 PRINT AT r,1; INK 1;"█";AT
r+1,1;"█"
190 LET x=x+a: LET y=y+d
200 LET n=ATTR (y,x)
202 REM to get █ type in 'a' in
graphics mode
205 PRINT AT y,x; INK 2;"█"
210 IF y=2 OR y=16 THEN LET d=-
d
220 IF n=57 OR x=30 THEN LET a=
-a: BEEP .01,20+RND*10
230 PRINT AT r,1;" ";AT r+1,1;"
240 LET r=r+(INKEY$="6")-(INKEY
$="7")
245 IF r=1 THEN LET r=r+1
247 IF r=16 THEN LET r=r-1
250 PRINT AT r,1; INK 1;"█";AT
r+1,1;"█"
260 IF n<56 THEN GO TO 300
270 LET t=t+(n-57)*5
275 BEEP .01,20+RND*10
280 PRINT AT 19,2;t
290 LET a=-a
300 PRINT AT y,x;" ": GO TO (x>
0)*20+110
320 PRINT AT 10,3; FLASH 1;"GAM
E OVER"
330 IF t>h THEN LET h=t
340 PRINT "High score is now "
;h
350 INPUT "Another Go?";a$
360 IF a$="n" THEN STOP
370 CLS : GO TO 10

```



ZAP

You are trying to prevent the ubiquitous aliens from landing (the story of our lives!). They can descend in any one of three directions: straight down, or diagonally down from the right or left.

You must position your base using the '5' and '8' keys and fire your missile using 'F' so that the missile intersects the alien's descent path.

Blocking the alien with your craft will have no effect. At the start of each game you are asked for a difficulty level (0-5), with 0 as the easiest level. This program was written by Paul Toland.

```

1 REM run lines 2-6 before ty
ping in rest of program
2 FOR a=1 TO 2: READ a$: FOR
t=0 TO 7
3 READ b: POKE USR a$+t,b
4 NEXT t: NEXT a
5 DATA "a",0,0,0,24,60,255,25
5,255
6 DATA "s",0,24,60,90,255,90,
129,129,0
7 LET c$="": LET b$="███"

```



```

8 FOR z=1 TO 32
9 LET c$=c$+CHR$ 16+CHR$ (RND
*6)+b$(z): NEXT z
10 LET t=0
20 INPUT FLASH 1; "Please type
in Level ?(0-5) "; l
30 LET bp=999: LET g=16
35 LET b=-1
40 CLS
50 PRINT AT 19,0; c$
60 LET t=t+1: LET r=INT (RND*3
)+1
70 PRINT AT 0,0; t
80 IF r=3 THEN LET p=INT (RND*
12)
90 IF r=2 THEN LET p=INT (RND*
16)*2
100 IF r=1 THEN LET p=INT (RND*
12)+20
110 LET i=r-2
120 FOR j=1 TO 19
125 REM to get A type in 's' in
graphics mode
130 PRINT AT j,p; INK 1; "A"
140 LET a$=INKEY$
150 PRINT AT 18,g; " "
160 LET g=g+(a$="8")*2-(a$="5")
*2
165 REM to get A type in 'a' in
graphics mode
170 PRINT AT 18,g; INK 2; "A"
180 IF a$="f" AND b=-1 THEN BEE
P .01,0: LET b=17
190 IF b=17 THEN LET bp=g
200 IF b>-1 THEN PRINT AT b,bp;
" "
210 LET b=b-1: PRINT AT b,bp; I
NK 3; " "
205 FOR z=5 TO 1*3 STEP -1: NEX
T z
210 IF (b=j OR b=j+1) AND bp=p
THEN GO TO 35
220 PRINT AT j,p; " "
230 LET p=p+i
240 NEXT j
250 PRINT AT j-1,p; " "; INK 1; "
A"; INK 0; " "
260 LET d$="The aliens have lan
ded"
270 FOR z=1 TO 22
280 BEEP .1,z
290 PRINT AT 21,z-1;d$(z)
300 NEXT z
310 PAUSE 10: BEEP .1,0: PAUSE
10: BEEP .2,0
320 PRINT AT 0,0; FLASH 1; INK
3; "Press 'Y' for a new game"
330 PAUSE 4e4
340 IF INKEY$="y" THEN CLS : GO
TO 7

```

CENTROPOID

You, a blue , travel around the screen hitting the '*', while avoiding the red squares. You must hit all ten '*' before the game ends. If you're successful, your time is given. CENTROPOID was written by Paul Toland.

```

10 RANDOMIZE
20 FOR i=0 TO 31
30 PRINT AT 0,i; INK 2; "■"; AT
21,i; "■"
40 NEXT i
50 FOR i=0 TO 21
60 PRINT AT i,0; INK 2; "■"; AT
i,31; "■"
70 PRINT AT RND*19+1,RND*29+1;
INK 2; "■"
90 NEXT i
100 FOR i=1 TO 10
110 PRINT AT RND*19+1,RND*29+1;
INK 3; "*"
120 NEXT i
130 LET t=0: LET h=0: LET x=3
140 LET y=3: LET a=0: LET d=1
150 LET a$=INKEY$
160 IF a$="5" OR a$="8" THEN LE
T d=0: LET a=SGN (VAL a$-6)
170 IF a$="6" OR a$="7" THEN LE
T a=0: LET d=SGN (VAL a$-6.5)*-1
180 LET x=x+a: LET y=y+d
190 LET n=ATTR (y,x)
200 PRINT AT y,x; INK 1; "■"
205 BEEP .2,x
210 IF n=59 THEN LET h=h+1
220 IF h=10 THEN GO TO 250
230 IF n=57 OR n=58 THEN GO TO
260
240 LET t=t+1: GO TO 150
250 PRINT AT 10,8; INK 5; FLASH
1; "Finished in "; t; " secs"
260 INPUT "Another game?"; a$
270 IF a$="n" THEN STOP
280 CLS : RUN

```

AVOID

Direct your evergrowing snake, using '5', '6', '7' and '8', so that it avoids the surrounding box, its own trail and the '+' signs. The object of the game is to last as long as possible and your time is given at the end of the game. AVOID was written by Paul Toland.


```

1 REM run lines 2-6 before ty
ping in rest of program
2 FOR x=1 TO 2: READ a$
3 FOR t=0 TO 7: READ a
4 POKE USA a$+t,a: NEXT t: NE
XT x
5 DATA "p",0,8,8,8,255,255,12
6,60
6 DATA "o",170,85,170,85,170,
85,170,85
7 LET h=1
8 POKE 23692,-1
9 LET s=0: LET u=15: LET p=10
10 PRINT AT u-1,p;" "
20 LET p=p-(p>1)
30 LET p=p+(INKEY$("<"))*2*(p<2
0)
40 LET n=ATTR (u,p)
50 IF n=56 THEN LET u=u-1: BEE
P .1,u
55 IF u=0 THEN GO TO 100
58 REM to get + type in 'p' in
graphics mode
60 PRINT AT u,p;"+"
70 PRINT AT 21,0;
75 REM to get type in 'o' in
graphics mode
80 PRINT TAB AND*20; INK 2;"███
███"
83 PRINT
85 FOR j=1 TO 10: NEXT j
90 LET s=s+u: GO TO 10
100 IF h<s THEN LET h=s
110 PRINT AT 0,0; INK 1; FLASH
1;"SURGE : " " Your score",s"
Highest score " ,h
120 INPUT "Another game ?";a$
130 IF a$="y" THEN CLS : GO TO
8

```

SURGE

In SURGE, written by Tim Rogers, your ship is somewhere out near a strange asteroid belt. The asteroids are slabs. Your ship has a protective shield around it, which means the asteroids cannot destroy your ship. The only problem is that you get pushed up the screen by any slabs you contact. The aim of the game is to stay on the screen for as long as possible. The lower down you are the more points you score.

```

10 RANDOMIZE
20 FOR i=0 TO 31
30 PRINT AT 0,i; INK 2;"███";AT
21,i;"███"
40 NEXT i
50 FOR i=0 TO 21
60 PRINT AT i,0; INK 2;"███";AT
i,31;"███"
70 PRINT AT AND*19+1,AND*29+1;
INK 3;"+"
90 NEXT i
100 LET t=0: LET h=0: LET d=1
110 LET x=2: LET a=0: LET y=5
120 LET a$=INKEY$
130 IF a$="5" OR a$="8" THEN LE
T d=0: LET a=SGN (VAL a$-6)
140 IF a$="6" OR a$="7" THEN LE
T a=0: LET d=SGN (VAL a$-6.5)*-1
150 IF a$="7" THEN LET d=-1
160 LET x=x+a: LET y=y+d
170 LET n=ATTR (y,x)
175 PRINT AT y,x; INK 1;"███"
177 BEEP .2,x
180 IF n=59 THEN LET h=h+1
190 IF n=57 OR n=58 OR h=6 THEN
GO TO 210
200 LET t=t+1: GO TO 120
210 PRINT AT y,x;"*"
220 PRINT AT 10,6; INK 4; FLASH
1;"You lasted ";t;" secs"
230 INPUT "New Game?";a$
240 IF a$="n" THEN STOP
250 CLS : RUN

```

MINEFIELD

You are in command of a squadron of tanks in this game written by I. S. Howson. Before you lies an enemy minefield through which you must pass. How many of your tanks will be lost finding a safe route across?

When you run the program the computer will generate a minefield — a different one each time you play. Drive your tank across the screen, using the forward, up and down keys.

If you hit a mine, the tank blows up and you must try again with the next tank. These are multiple mines and will destroy every tank which hits them. Your score is displayed at the top of the screen. If you are successful in finding a way across, the program stops, playing a little tune.

You will find that you get quite good at avoiding the littered battle field as the game progresses.

```

1 REM run lines 2-5 before ty
ping in rest of program
2 FOR t=0 TO 7: READ y,z
3 POKE USR "a"+t,y: POKE USR
"s"+t,z: NEXT t
4 DATA 0,0,0,0,0,0,0,0
5 DATA 15,242,15,244,15,248,1
5,240
10 LET s=0
20 RANDOMIZE
30 LET b=0: LET a=10
40 PRINT AT 0,0: INK 2; FLASH
1; "Tanks Destroyed "s
60 PRINT AT a-1,b; "
65 REM to get type in 'a' a
nd 's' in graphics mode
70 PRINT AT a,b: INK 1; "
80 PRINT AT a+1,b: INK 1; "
90 PRINT AT a+2,b: "
100 LET b=b+(INKEY$="8")
110 LET a=a+(INKEY$="6")-(INKEY
$="7")
120 IF b=INT (RND*30) OR a=INT
(RND*20) THEN GO TO 150
130 IF b=28 THEN GO TO 210
140 GO TO 60
150 PRINT AT a,b: INK RND*6; FL
ASH 1; "BANG"
155 FOR t=-20 TO -10: BEEP .01,
t
157 BORDER RND*7
160 PRINT AT a+1,b: INK 7; "
;AT a+1,b; "
165 BEEP .01,10+t
170 PRINT AT a+1,b: INK 0; "
;AT a+1,b; "
175 NEXT t
180 LET s=s+1
190 PRINT AT 1,8: INVERSE 1; "TA
NKS"
200 IF s>19 THEN STOP
205 GO TO 20
210 PRINT AT 10,0: INK 2; "YOU H
AVE SURVIVED"
220 BEEP 2,20: BEEP 1.5,15: BEE
P 1,10: BEEP .5,5

```

Tanks Destroyed 12
TANKS

BANG BANG
BANG
BANG BANG BANG
BANG

BILLBOARD

This program will allow you to get an enlarged version of any character: ordinary, graphic or defined. Keywords and functions are not possible.

You can only have four characters a line, choosing the colour of the characters. The variable X holds the starting address, in the ROM, where the characters are.

```

1 REM Bill Board
2 REM by D. Harwood
4 LET d=0
5 LET x=PEEK 23606+256*PEEK 2
3607
10 INPUT "Ink colour ? ";i: IN
K i
20 INPUT "Type in 4 letters "
;a$
25 FOR k=0 TO 3
30 LET p1=x+CODE a$(k+1)*8
40 FOR g=0 TO 7
50 LET p=PEEK (p1+g)
60 FOR j=0 TO 7
70 IF p/2<>INT (p/2) THEN PRIN
T AT 13+g,8-j+(k*8); INK i;"
80 LET p=INT (p/2)
90 NEXT j: NEXT g: NEXT k
100 INPUT "Again ? ";s$
110 POKE 23692,-1
120 IF s$(1)="y" THEN PRINT "...
": GO TO 10

```


Four a Line

CATCH

In this program by Andrew Lovering, you see an open box near the bottom of the screen. Pressing '8' moves you to the right, '5' moves you to the left. You have to try and catch a rapidly descending balloon, dropped from a random position at the top of the screen. To confuse you, and to introduce an element of luck into the game, a lid appears at random places above the box.

If the balloon reaches the bottom, or it hits the lid, your score is printed and the game is re-run when any key is pressed.

```

1 REM run lines 2-4 before ty
ping in rest of program
2 FOR t=0 TO 7: READ z
3 POKE USR "p"+t,z: NEXT t
4 DATA 56,124,254,124,56,16,1
5,95
5 LET d=0
10 LET a=14: LET c=INT (RND*30
)+1
15 LET x=RND*5: LET y=RND*5
20 LET a=14: LET c=INT (RND*30
)+1: LET b=0
30 LET b=b+1

```

```

35 REM to get ? type in 'p' in
graphics mode
40 PRINT AT b,c: INK y;"?"
50 LET a=INT (RND*30)
60 PRINT AT 19,e: INK x;" "
70 PRINT AT 20,a: INK x;" "
80 PRINT AT 21,a: INK x;" "
90 IF INKEY$="5" AND a>0 THEN
LET a=a-1
100 IF INKEY$="8" AND a<29 THEN
LET a=a+1
110 IF b=18 AND c=e+1 THEN GO T
O 190
120 IF b=20 AND c=a+1 THEN GO T
O 150
130 IF b=21 THEN GO TO 190
140 CLS : GO TO 30
150 LET d=d+1
160 PRINT AT 0,0: INK 1: FLASH
1,"Score ";d
170 FOR j=10 TO 20: BEEP .1,j
175 BEEP .1,20-j: NEXT j
180 GO TO 10
190 PRINT AT 0,0: INK 1: FLASH
1,"Score ";d
200 PAUSE 4e4: RUN

```

STAR SWERVER

Tim Rogers wrote this great game, in which you have to steer your spaceship past the stars, leaving a trail as you whizz across the universe.

Each time the computer creates the universe with stars you get a chance to see where they are placed, so that when your ship enters the universe at a random height from the right, you will have some idea of where to steer your ship to avoid them. Your score is given at the end of the game. When you hit a star, a noisy explosion occurs.

```

1 REM run lines 2-4 before ty
ping in rest of program
2 FOR t=0 TO 7: READ a
3 POKE USR "p"+t,a: NEXT t
4 DATA 24,60,126,255,126,90,1
53,24
10 LET s=0
30 PAPER 0: BORDER 0: INK 7: C
LS
40 FOR a=1 TO 30
50 PRINT AT INT (RND*20),INT (
RND*32); INK 4;"*"

```



```

55 NEXT a
60 LET p=INT (RND*21)
70 FOR a=31 TO 0 STEP -1
75 REM to get * type in 'p' in
graphics mode
80 PRINT AT p,a;"*"
90 IF ATTR (p,a-1)=4 THEN GO TO 160
100 PRINT AT p,a;"■"
110 LET p=p+(INKEY$="6")-(INKEY$="7")
120 LET s=s+1
121 FOR g=1 TO 100: NEXT g
130 NEXT a
140 FOR g=1 TO 20: NEXT g
150 CLS : GO TO 40
160 FOR s=1 TO 10
165 BEEP .1,s
170 PRINT AT p,a-2; INK 0;"■"
180 BEEP .1,10-s
190 PRINT AT p,a-2; INK 7;"■"
200 NEXT s
210 FOR g=1 TO 100: NEXT g
240 PRINT FLASH 1;"Score=";s

```

GALAXY PATROL

GALAXY PATROL places you in command of a Galactic patrol ship. Your spaceship starts with 50 gallons of fuel which slowly decreases. The amount of fuel left is shown in the top right of the screen.

You re-fuel your spaceship by hitting any of the random fuel dumps (green squares). Each time you run through a fuel dump you get 25 gallons. You control your craft by pressing the 'M' key. Holding down the 'M' moves you right, and leaving the keyboard untouched, allows your craft to drift, sideways.

The game ends and your score is displayed — either when you run out of fuel, or hit a red asteroid. This program was written by R. Stubbs.

```

1 REM run lines 2-4 before typ
ing in rest of program
2 FOR t=0 TO 7: READ a
3 POKE USR "p"+t,a: NEXT t
4 DATA 24,60,126,255,126,90,1
53,24
10 LET f=50: LET s=0: LET a=0:
LET b=13

```

```

20 PRINT AT 21,RND*30; INK 2;"
*"
30 LET r=INT (RND*10)+1
35 IF r=9 THEN PRINT AT 8,RND*
30; INK 4;"■"
40 LET s=s+1: LET f=f-1
50 POKE 23692,-1: PRINT '
50 IF b>2 THEN LET b=b-1
70 IF INKEY$="■" AND b<28 THEN
LET b=b+2
72 IF f<10 THEN PRINT AT 0,20;
INK 3; INVERSE 1;"LOW FUEL ": B
EEP .01,0: GO TO 75
73 PRINT AT 0,20;" "
75 REM to get * type in 'p' in
graphics mode
80 PRINT AT 0,b;"*";TAB 29;f
90 LET p=ATTR (1,b)
100 IF p=58 THEN GO TO 140
110 IF p=60 THEN LET f=f+25
120 IF f=0 THEN GO TO 150
130 GO TO 20
140 PRINT INK 2; FLASH 1;"Bad l
uck,you have crashed": GO TO 160
150 PRINT INK 1; FLASH 1;"Bad l
uck,you have run out of fuel"
160 FOR t=1 TO 10: BEEP .1,t: N
EXT t
170 INPUT "Another game ? ";a$
180 IF a$(1)="y" THEN RUN

```

ZOMBIES

In this version of ZOMBIES, you start in the top left corner of the screen and must reach the bottom right. You can move left, right and down — but not up—using the '5', '6' and '8' keys. You must not bump into a ZOMBIE. Be careful... as they are following you!

The program uses a 'face' character for you and a blob for the ZOMBIE.

```

1 REM Zombies by D Harwood
2 REM run lines 3-6 before ty
ping in rest of program
3 FOR t=0 TO 7: READ a,b
4 POKE USR "p"+t,a: POKE USR
"o"+t,b: NEXT t
5 DATA 60,60,66,126,165,255,1
65,255
6 DATA 129,255,189,255,66,126
,60,60

```



```

10 PRINT INK 1; FLASH 1; "ZOMBI
ESZOMBIESZOMBIESZOMBIES"
20 PRINT " INK RND*5; "You mus
t make your way to home but be
careful you are being"
30 PRINT INK RND*5; "followed b
y " INK 2; FLASH 1; "ZOMBIES"; I
NK RND*5; FLASH 0; " which you
must not bump into to"
40 PRINT "TAB 7; INK 2; FLASH
1; "PREPARE YOURSELF"
50 PAUSE 300
60 CLS
70 BORDER RND*5
80 PRINT AT 0,0; INK 1; FLASH
1; "S"; AT 21,31; INK 1; FLASH 1; "
H"
90 LET x=0: LET y=1: LET c=4:
LET d=4
110 IF INKEY$="" THEN GO TO 110
120 PRINT AT x,y; INK 1; " "
130 LET x=x+(INKEY$="8")-(x>21)
140 LET y=y+(INKEY$="8")-(INKEY
$="5")+(y<0)-(y>30)
150 LET p=ATTR (x,y)
160 IF p=58 THEN GO TO 300
161 FOR g=1 TO 2
162 IF c<20 THEN LET c=RND*3+x
164 IF d<28 THEN LET d=RND*6-3+
y
165 REM to get ● type in 'o' in
graphics mode
170 PRINT AT c,d; INK 2; "●"
171 NEXT g
175 REM to get @ type in 'p' in
graphics mode
180 PRINT AT x,y; INK 1; "@"
190 IF x=21 AND y=31 THEN GO TO
210
200 GO TO 110
210 PRINT AT 21,0; INK 1; FLASH
1; "Well done, you survived"
220 FOR t=1 TO 10
230 BEEP .1,t: BEEP .2,10-t
240 NEXT t
250 STOP
300 PRINT AT 10,0; INK 1; FLASH
1; "They got you....."
320 FOR a=1 TO 10
330 READ b,c: BEEP b,c
340 NEXT a
350 DATA 1,0,1,0,.5,2,.5,0,.5,3
,.5,0,.5,-1,.5,0,.5,1,1,0
360 STOP

```

MORSE TRAINER

You can master Morse Code with the help of this program from John Knight. When you run the program, a menu will appear, giving you the option of entering an English message, and having it reprinted and sounded in Morse, or having the program generate a Morse sound and symbol at random. The program gives you three tries at entering its English equivalent, or of ending the program.

The routine at line 9000 strips A\$ down to elements of C\$. To simplify later processing, C\$(97) is the equivalent of CHR\$(97), i.e. the letter 'a'. This program shows a good application of the BEEP command.

```

10 REM Morse Trainer
20 REM © J Knight, 1982
30 GO SUB 9000
40 POKE 23692,-1
70 PRINT " INK 2; FLASH 1; "MAK
E A SELECTION"
80 PRINT "1-English to Mors
e"
90 PRINT "2-Morse to English
"
100 PRINT "3-End"
110 IF INKEY$="" THEN GO TO 110
120 GO SUB VAL (INKEY$)*1000
130 GO TO 40
1000 REM English to Morse
1010 PRINT INK 1; "ENGLISH TO
MORSE"
1020 PRINT " INK 2; "Enter your
message, then"
1030 PRINT "TAB 3; INK 2; FLASH
1; "PRESS ENTER"
1040 INPUT w$
1045 PRINT
1050 FOR g=1 TO LEN w$
1060 IF w$(g)="" THEN GO TO 1090
1070 PRINT
1080 GO TO 1100
1090 PRINT c$(CODE w$(1));
1092 LET z$=c$(CODE w$(1)): GO S
UB 5000
1100 LET w$=w$(2 TO )
1110 NEXT g
1120 IF INKEY$="" THEN GO TO 112
0
1130 RETURN
2000 REM Morse to English
2010 PRINT "I will give you a
letter in"

```



```

2020 PRINT "Morse, and you have t
free guesses to work out what it
2030 PRINT " INK 2; FLASH 1; "PRE
55 ENTER when you are ready to
start"
2040 IF INKEY$="" THEN GO TO 204
0
2050 LET s=0
2060 FOR z=1 TO 10
2070 LET j=97+INT (RND*26)
2080 PRINT "What letter does "
:c$(j) "represent?"
2090 LET z#=c$(j): GO SUB 5000
2100 FOR h=1 TO 3
2140 INPUT INK RND*5; "Your guess
":k$
2150 IF CODE (k$)=j THEN GO TO 2
200
2160 IF h<3 THEN PRINT " INK 1;
: "No, try again"
2170 IF h=3 THEN PRINT "c$(j); "
Represents ";CHR$ j
2175 LET z#=c$(j): GO SUB 5000
2180 NEXT h
2190 GO TO 2220
2200 PRINT " INK 2; FLASH 1; "Yes
, you are right"
2210 LET s=s+1
2220 PRINT " INK RND*5; "Your sc
ore is ";s; " out of ";z
2230 PRINT " INK 3; "
2240 NEXT z
2250 RETURN
2260 STOP
5000 FOR c=1 TO 5
5010 IF z$(c)="" THEN BEEP .1,0
5020 IF z$(c)="-" THEN BEEP .5,0
5030 PAUSE 10: NEXT c
5040 RETURN
9000 LET a$=".-*-----*-----*
.-*-----*-----*-----*
.-*-----*-----*-----*
*-----*-----*-----*
9010 DIM c$(122,5)
9020 FOR b=97 TO 122: LET b$=""
9030 FOR c=1 TO 5
9040 IF a$(1)="*" THEN GO TO 907
0
9050 LET b#=b#+a$(1): LET a$=a$(
2 TO )
9060 NEXT c
9070 LET c$(b)=b$: LET a$=a$(2 T
O )
9080 NEXT b
9090 RETURN

```

REVERSE

In this program, you are given a 10 digit number (digits 0-9) and you have to put this number into ascending order (i.e. 1234567890) by 'reversing'. I'll make 'reversing' clear by an example. If we had the number 1234567980 and when asked for our reverse number we typed in 9, we would then get 1234567908. If we then typed 8, we would get 1234567809. If we then typed 9, we would get 1234567890 and would have finished.

At the end, the computer tells you how many goes it took to get the number into the right order.

```

1 LET x=0: LET a$=""
10 INK 1: CLS
20 PRINT TAB 7;"R ";: PAUSE 10
: PRINT "E ";: PAUSE 10: PRINT "
U ";: PAUSE 10: PRINT "E ";
30 PAUSE 10: PRINT "R ";: PAUS
E 10: PRINT "S ";: PAUSE 10: PRI
NT "E"
40 PRINT "You must try and a
rrange the"
50 PRINT "10 figure number int
o ascending"
60 PRINT "order, i.e. "; INK 2;
FLASH 1; "1234567890"
70 PRINT "e.g. If you had th
e number-" INK 1; FLASH 1; "1234
567098"
80 PRINT "and when asked to re
verse you"
90 PRINT "typed in "; INK 2; F
LASH 1; "8"; INK 1; FLASH 0; ", you
would change the"
100 PRINT "number to "; INK 1;
FLASH 1; "1234567890"; FLASH 0; "
and would"
110 PRINT "have finished."
120 PRINT " INK 3; FLASH 1; "PR
ESS ANY KEY TO CONTINUE"
130 PAUSE 10000
140 CLS: POKE 23562,-1
150 FOR t=0 TO 9
160 LET l=INT (RND*10)+48
170 GO SUB 500: LET a$=a#+CHR$
l
180 NEXT t
190 PRINT " INK RND*5; a$
210 INPUT "Reverse number?"; r
220 PRINT INK RND*5; "Reverse nu
mber-"; FLASH 1; r

```



```

230 GO SUB 1000: LET X=X+1
240 IF a$((">"1234567890" THEN GO
TO 190
250 PRINT "    INK RND*5; FLASH
1;a$;" "; INK RND*5;a$;" "; INK
RND*5;a$
260 FOR t=10 TO 30: BEEP 1/t,t:
NEXT t
270 PRINT "    INK RND*5;"You did
it in ";x;" goes"
280 STOP
500 FOR i=1 TO t
510 IF a$(i)=CHR$ 1 THEN GO TO
160
520 NEXT i
530 RETURN
1000 LET b$=""
1010 FOR i=10 TO r STEP -1
1020 LET b#=b#+a$(i)
1030 NEXT i
1040 LET a#=a$( TO r-1)+b$
1050 RETURN

```

ADVERTISING DISPLAY

This is a message display program suitable for advertising or just showing off your Spectrum. You first create a screen, in a chosen colour, using '5', '6', '7' and '8' to control directions. '1' turns the pen on, '2' turns it off. Once the screen is complete, press 'S' to stop, then enter your message, and the line which it is to appear on. The message can be of any length. Once this is entered you return to the menu and can then select your next option. Type 'S' to stop displaying a message.

The program stores 10 screens, but only one message because of the variable length that message can take. ADVERTISING DISPLAY was written by Paul Toland.

```

1 DIM s$(5,704)
2 LET c$=""
3 CLS
4 POKE 23692,-1: PRINT AT 21,
0;
10 PRINT INK 1;"1-Create new s
creen""2-Display existing scree
n""3-change message""4-Stop"
20 INPUT ;c

```

```

30 IF c<1 OR c>4 THEN GO TO 20
40 IF c=4 THEN STOP
50 IF c=3 THEN GO TO 230
60 INPUT INK 2; FLASH 1;"Scree
n No. ? (1-5)";no
70 IF no<1 OR no>10 OR no(">INT
no THEN GO TO 60
80 IF c=2 THEN GO TO 300
85 INPUT "Ink colour ?";d
90 PRINT INK 2;"Create main di
splay using 5,6,7 +8 to contr
ol the cursor"
100 PRINT "    INK 1;"Use 1 for
2 for space""S to stop"
110 LET X=16: LET Y=10
120 LET s$(no,1 TO 704)=""
121 FOR i=1 TO 100: NEXT i
125 PRINT AT 0,0; INK d;s$(no);
AT Y,X; INK 1; FLASH 1;"+"
130 LET i$=INKEY$
140 IF i$="1" THEN LET c$="█"
150 IF i$="2" THEN LET c$=""
160 LET X=X-(i$="5")+(i$="8")
170 LET X=X+(X<0)-(X>31)
180 LET Y=Y-(i$="7")+(i$="6")
190 LET Y=Y+(Y<0)-(Y>21)
200 LET s$(no,Y*32+X+1)=c$
210 IF i$="S" THEN GO TO 230
220 GO TO 125
230 INPUT INK 1;"On which line
do you want your sentence to ap
pear ?0-21";l
240 IF l<0 OR l>21 THEN GO TO 2
30
245 INPUT INK 1;"...in what ink
colour";z
246 INPUT FLASH 1;"FLASHING ?(1
-yes 0-no)";q
250 INPUT INK 2; FLASH 1;"INPUT
your message...";i$
260 LET l$=""
    "+i$+"
270 GO TO 5
300 PRINT AT 0,0; INK d;s$(no)
310 FOR i=1 TO LEN l$-32
320 PRINT AT l,0; INK z; FLASH
q;l$(i TO i+31)
330 IF INKEY$="S" THEN STOP
335 PAUSE 3
340 NEXT i
350 GO TO 310

```


CHEQUEBOOK

This program should help make sure your cheque account does not become overdrawn. The program leads you through entering information regarding your account, gives you the option of altering a particular entry if needed, and — at the end of the run — prints out information on all the cheques written (who it was made out to, and why, and the amount). The program then prints out the final balance and, if necessary, gives you the good news that you are overdrawn. This program was written by Tim Hartnell.

```

5 LET a$=CHR$ 8+CHR$ 8+CHR$ 8
+CHR$ 8+CHR$ 8+CHR$ 8+CHR$ 8
7 INK 1: CLS
10 REM Cheque book Balancer
20 REM © T Hartnell 1982
30 POKE 23692,-1
40 INPUT INK 2; FLASH 1;"Enter
the last balance known ";b
50 PRINT "Starting balance £";
b
60 PRINT "Deposit";a$; OVER 1
; INK 2;"
65 PRINT "Balance";a$; OVER 1;
INK 2;"
70 INPUT INK 2; FLASH 1;"Enter
deposit made (0 to end) ";d
80 IF d=0 THEN GO TO 120
90 LET b=b+d
100 PRINT d;b
110 GO TO 70
120 PRINT "The balance before
latest "cheques written was ";
INK 2; FLASH 1;"£";b
130 INPUT INK 2; FLASH 1;"How m
any checks have you writt
en since then ";n
140 DIM a$(n,22): DIM b(n)
150 FOR g=1 TO n
160 INPUT INK 2; FLASH 1;"Enter
name made out to ";n$
170 INPUT INK 2; FLASH 1;"Enter
reason for check ";m$
180 LET a$(g)=n$+"- "+m$
190 INPUT INK 2; FLASH 1;"How m
uch was check for? ";q
200 LET b(g)=q
210 PRINT a$(g);"- "; INK 2; F
LASH 1;"£";b(g)
220 INPUT INK 2;"If this is cor
rect press enter if it is not,
type in 'e' ";u$

```

```

230 IF u$="e" THEN GO TO 160
240 LET b=b-q
250 NEXT g
260 PRINT "This is a record
of your "cheques to date."
270 PRINT "
"
280 PRINT "
290 FOR g=1 TO n
300 PRINT a$(g);"- "; INK 2; F
LASH 1;"£";b(g)
310 NEXT g
315 PRINT "
"
320 PRINT "Final balance is ";
INK 2; FLASH 1;"£";b
325 PRINT "
"
330 POKE 23692,-1
330 PRINT "Enter 'r' to run t
he program"
340 PRINT "from scratch"
350 PRINT "or 'p' for a detail
ed"
360 PRINT "print-out of cheques
written"
370 PRINT "or 'e' to end"
380 INPUT u$
400 IF u$="r" THEN RUN
410 IF u$="b" THEN GO TO 50
420 IF u$="p" THEN GO TO 450
430 IF u$="e" THEN PRINT INK 3;
FLASH 1;TAB 7;"PROGRAM TERMINAT
ED": STOP
440 GO TO 390
450 REM **print out
460 FOR g=1 TO n
470 LPRINT a$(g),"£";b(g)
480 NEXT g
490 GO TO 330

```


ALLEY DRIVER

In ALLEY DRIVER, written by Said Hassan, you have to drive a green car down a constantly twisting track. The car races down the screen. After each section is completed, the screen clears and a new track appears. The program has a high score feature.

```

2 FOR t=0 TO 7: READ a,b
3 POKE USR "p"+t,a: POKE USR
  "o"+t,b
4 NEXT t
5 DATA 170,255,85,255,170,60,
85,60
6 DATA 170,60,85,60,170,255,8
5,255
7 LET c$="C R A S H "
10 LET h=0
20 LET s=0
25 LET x=5: LET a=3: CLS
30 FOR n=0 TO 20
35 REM to get █ type in 'p' in
graphics mode
40 PRINT TAB a; INK 1; "█"; INK
2; "██"; INK 1; "█"
50 LET a=a+(a<7 AND a)*SGN (RN
D-.5)+(NOT a)-(a=7)
60 NEXT n
70 LET a=x
80 FOR n=1 TO 20
90 LET p=ATTR (n,x)
105 REM to get █ type in 'o' in
graphics mode
110 PRINT AT n-1,a; INK 2; "██";A
T n,x; INK 4; "█"
120 IF p=57 THEN GO TO 170
130 LET a=x
140 LET x=x+(INKEY$="m")-(INKEY
$="z")
145 FOR j=1 TO 30: NEXT j
150 NEXT n
160 LET s=s+n: GO TO 25
170 LET s=s+n
175 FOR a=1 TO 10: BORDER RND*7
: BEEP .1,a-10
180 PRINT AT 2,10+a; INK RND*5;
c$(a)
185 NEXT a
185 PRINT AT 4,11;"SCORE=";s
190 IF h<s THEN LET h=s
200 PRINT AT 6,11; INK 1; FLASH
1;"High score=";h
210 INPUT "Do you want to play
again ?";a$
230 IF a$(1)="y" THEN GO TO 20

```



UTILITIES AND DEMONSTRATIONS

Your Spectrum has colour, sound and excellent graphic capabilities, and it is also useful in the mathematical field. It can be made to perform quite useful and complex tasks. The next few programs give an indication of the variety of ways in which the Spectrum can be used.

The first program is very simple, and calculates the remainder after a division. The usual division sign is used, having been defined in lines 3-5.

The second program is a useful statistics one, which finds the area under a curve of Normal Distribution, at the point which you enter for the variable X at line 20. This program is accurate only to about 10^{-4} .

The third program is a demonstration program, which uses the Spectrum's splendid string handling, enabling commands to 'count' in words from zero to 99. A beep sounds for every count.

The fourth program converts temperatures from Centigrade to Fahrenheit.

The fifth program draws a conversion graph, using an easy to follow colour scale, which changes Fahrenheit to Centigrade.

The sixth program works out how much you have to pay on a loan, when the amount involved and the interest rate change.

```

1 REM *Calculation of remainder
2 REM run lines 2-4 before running rest of program
3 FOR t=0 TO 7: READ a
4 POKE USR "p"+t,a: NEXT t
5 DATA 24,24,0,255,255,0,24,2
4
15 POKE 23692,-1
20 INPUT INK 1;"Enter number t
to be divided ";a
30 INPUT ( INK 2;a;" divided b
by ");b
40 PRINT " INK RND*5;a;" ÷ ";b
;" = ";INT (a/b);" remainder ";a
-b*INT (a/b)
50 GO TO 20

```

$3212 \div 32 = 100$ remainder 12

$234 \div 9 = 26$ remainder 0

$213 \div 6 = 35$ remainder 3

```

5 REM *Normal Distribution
7 POKE 23692,-1
10 PRINT INK 1;"Normal Distribution"
20 INPUT INK 1; FLASH 1;"X=";X
30 LET t=1/(1+0.231642*X)
40 LET q=1/SQR (2*PI)*EXP (-X^2/2)
50 LET a=0.319382: LET b=-0.35
5564
60 LET c=1.781480: LET d=-1.82
1256
70 LET e=1.330274
80 PRINT INK RND*5;"PX=";1-q*(
a*t*b*t^2+c*t^3+d*t^4+e*t^5)
90 GO TO 10

```

```

5 POKE 23692,-1: PRINT AT 21,
0;
10 LET t$=" Zero one two
three four five six seven ei
ght nine "
20 FOR z=0 TO 9: FOR x=0 TO 9
30 LET k=1+6*z
40 IF z=0 THEN LET q$="": GO T
O 60
50 LET q$=t$(k TO k+5)
60 LET k=1+6*x
70 LET q$=q$+t$(k TO k+5)
80 PRINT INK RND*5;q$
85 FOR t=1 TO z*10+x: BEEP .1,
10: NEXT t
90 NEXT x: NEXT z

```

Zero	
one	
two	
three	
four	
five	
six	
seven	
eight	
nine	
one	Zero
one	one
one	two
one	three
one	four
one	five
one	six
one	seven
one	eight
one	nine

```

1 REM centigrade to fahrenheit
it
2 REM run lines 3-5 before ty
pin in rest of program
3 FOR t=0 TO 7: READ a
4 POKE USR "p"+t,a: NEXT t
5 DATA 64,160,64,0,0,0,0,0
10 POKE 23692,-1: PRINT AT 20,
0;
20 INPUT INK 2; FLASH 1;"Centr
igrade Temperature ? ";c
30 LET f=1.8*c+32
35 REM to get " type in 'p' in
graphics mode

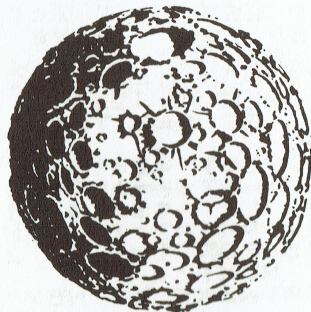
```



```

50 PRINT ' INK RND*5;c;" centr
igrade = ";f;" fahrenheit"
60 GO TO 20

```



```

100° centrigrade = 212° fahrenheit
50° centrigrade = 122° fahrenheit
32° centrigrade = 89.6° fahrenheit
12° centrigrade = 53.6° fahrenheit

```

```

10 REM conversion graph
20 REM fahr. to cent.
30 FOR f=30 TO 220 STEP 10
40 IF f<100 THEN PRINT " ";
50 PRINT f;
60 FOR c=1 TO 5*(f-32)/45
75 IF c/5-1=INT (c/5-1) THEN L
ET i=0
65 LET i=i+1
70 PRINT INK i;" ";
75 NEXT c
76 LET i=0: PRINT
80 NEXT f
90 PRINT 'TAB 3;"1020304050607
00090100"

```

```

30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220

```

102030405060708090100

```

2 INK 1: CLS
5 POKE 23692,-1: PRINT AT 20,
0
10 PRINT "Interest on Loan"
20 INPUT INK 2; FLASH 1;"Enter
amount ";a
30 INPUT INK 3; FLASH 1;"Enter
interest rate ";i
40 LET i=i/100
50 INPUT INK 4; FLASH 1;"Enter
length of loan in years ";y
60 LET y=12*y
70 LET b=a*(i/12)/(1-(1+(i/12)
)↑-y)
80 LET b=INT (b*100+.5)/100
90 PRINT "The monthly payment
is "; INK 2; FLASH 1;"$";b
100 IF INKEY$="" THEN GO TO 100
110 GO TO 10

```


ALPHASORT

This program sorts out words or phrases into alphabetical order. You first enter (line 10) the number of items you wish to sort, then enter the words one at a time (line 50), pressing ENTER after each word.

```

10 REM Alphasort
20 INPUT INK 2; FLASH 1; "Enter
number to be sorted "; n
30 DIM s$(n+1,15)
40 FOR t=1 TO n
50 INPUT INK RND*5; ("Item "; t;
"; "); LINE s$(t)
60 NEXT t
70 PRINT INK RND*5; "Wait...I a
m sorting"
80 FOR i=1 TO n: FOR t=1 TO n
85 LET b$=s$(t)
90 IF s$(t+1)>=s$(t) THEN GO T
O 110
100 GO TO 130
110 LET s$(t)=s$(t+1)
120 LET s$(t+1)=b$
130 NEXT t: NEXT i
140 FOR t=n TO 1 STEP -1
150 PRINT INK RND*5; s$(t)
160 NEXT t

```

DATA SORT

This program sorts numbers into ascending order, and then prints them out.

```

5 LET y=1: LET x=5: LET a=5
10 INPUT INK RND*5; FLASH 1; "H
ow many items do you want
to sort? "; n
20 DIM a(n+1)
30 FOR g=1 TO n
40 INPUT INK RND*5; FLASH 1; ("
Item "; g; " "); a(g)
45 NEXT g
47 FOR g=1 TO n: FOR t=1 TO n
50 IF a(t+1)<a(t) THEN GO TO 60
60 LET b=a(t)
70 LET a(t)=a(t+1): LET a(t+1)
=b
80 NEXT t: NEXT g
90 FOR t=n TO 1 STEP -1
100 PRINT INK RND*5; "Item "; n-t
+1; ": "; a(t)
110 NEXT t

```

SQUARE ROOTS

This program will work out the square root of any number you enter. It first takes a guess (line 50) by picking any number between zero and the entered number. The computer then refines that guess by division, over and over again, checking each time to see how close to the correct answer it is. Line 80 is not part of the computer's checking apparatus but is there simply so you can watch the action of the computer as it searches for the correct answer (verify this by deleting line 80).

As the Spectrum has a SQR function, this program is of little practical use, but it is fascinating to run and watch how quickly it narrows in on the correct answer. The program was written by Tim Hartnell.

```

10 REM Square root solver
20 REM © Hartnell 1982
30 INPUT INK RND*5; FLASH 1; "W
hich number do you want me to
find the square root of? "; b
40 IF b<0 THEN GO TO 30
45 PRINT INK 1; FLASH 1; "Numbe
r is "; b
50 LET a=INT (RND*b)+1
60 LET x=b/a: LET y=(x+a)/2
70 PRINT INK RND*5; y
80 PRINT INK RND*5; "Error is "
; ABS (y-SQR b)
90 IF a=y THEN GO TO 110
100 LET a=y: GO TO 60
110 PRINT " INK RND*5; FLASH 1
; "The square root is "; y

```

```

Number is 10
3.83333333
Error is 0.671055567
3.2210145
Error is .058736833
3.1628132
Error is .00053554773
3.1622777
Error is 4.5634806E-8
3.1622777
Error is 0
3.1622777
Error is 0

```

The square root is 3.1622777

PROBABILITY

This next program, by Martin Frobisher, prints out a table and graph showing the possible rolls of three dice. The first column on the table shows the total of the three dice, the second shows the number of possible combinations that can make this total, and the third give the odds of this total appearing.

The graph printed alongside the table is the Normal Distributive curve, and shows the probability of the dice falling with a particular total.

```

1 LET J=RND*6
2 FOR b=3 TO 18
5 PRINT AT b,20; PAPER J;
6 NEXT b
10 DIM a(18)
20 FOR b=1 TO 6
30 FOR c=1 TO 6
40 FOR d=1 TO 6
50 LET e=b+c+d
60 LET a(e)=a(e)+1
70 NEXT d: NEXT c: NEXT b
80 FOR b=3 TO 18
90 PRINT AT b,0;b;TAB 5;a(b);T
AB 10;INT (216/a(b));" TO 1"
100 PLOT INK 9;2*b+200,50+3*a(b)
110 NEXT b

```

3	1	216 TO 1
4	3	72 TO 1
5	6	36 TO 1
6	10	21 TO 1
7	15	14 TO 1
8	21	10 TO 1
9	25	8 TO 1
10	27	8 TO 1
11	27	8 TO 1
12	25	8 TO 1
13	21	10 TO 1
14	15	14 TO 1
15	10	21 TO 1
16	6	36 TO 1
17	3	72 TO 1
18	1	216 TO 1

Q-REG (CORRELATION/ REGRESSION)

Q-REG is a correlation/regression program. It accepts your X data first of all, terminated by 999, and then the Y values.

The program then calculates the various sub-totals (sum of X, Y, etc.), Pearson's Correlation Coefficient, and the regression equation (linear).

At this stage, press any key to continue. You are then able to interpolate/extrapolate this equation of the line by entering the X values, terminating by entering 999.

At each stage of the program, you are given the option of outputting the current information to the printer, assuming you have answered the 'PRINTER CONNECTED?' question with a 'Y'. You can get the program to re-run by just pressing ENTER, or get it to stop by typing 'N', then pressing ENTER. This program was written by Paul Toland.

```

1 INK 1: CLS
5 POKE 23692,-1: PRINT AT 20,
0;
10 PRINT "Correlation / Regres
sion"
20 INPUT "Is the printer conne
cted ";p$
30 GO TO 70
31 IF p$="n" THEN RETURN
33 INPUT FLASH 1;"Print this p
age ?";a$
40 IF a$<>"y" THEN RETURN
50 COPY
60 RETURN
70 DIM x(20): DIM y(20)
80 PRINT " INK RND*5;"Enter x
values in order - End wit
h 999"
90 FOR i=1 TO 20
100 INPUT INK 1;("Value ";i;" "
);x(i)
110 IF x(i)=999 THEN GO TO 150
130 NEXT i

```



```

140 PRINT " INK 2; FLASH 1;"20
IS MAX ALLOWED"
150 LET i=i-1
160 PRINT "AT 21,12;i;" Values
170 PRINT " INK,RND*5;"Enter Y
values in order"
180 FOR j=1 TO i
190 INPUT INK 1; ("Value ";j;" "
);y(j)
200 NEXT j
210 GO SUB 31
220 LET c=0: LET d=0
225 LET e=0: LET f=0: LET g=0
230 FOR j=1 TO i
240 LET c=c+x(j)
245 LET d=d+y(j)
250 LET e=e+x(j)*x(j)
260 LET f=f+y(j)*y(j)
270 LET g=g+x(j)*y(j)
280 NEXT j
290 LET r=(i*g-c*d)/SQRT((i*e-c
↑2)*(i*f-d↑2))
300 CLS
310 PRINT "Sum X ";c; INK 2;"Su
m Y ";d; INK 3;"Sum of X↑2 ";e;
INK 4;"Sum of Y↑2 ";f; INK 5;"
Sum of XY ";g
320 PRINT "Pearsons Correlatio
n coefficient"
330 PRINT TAB 6;r
340 PRINT "Coefficient of dete
rmination"
350 PRINT TAB 6;r*r
360 LET b=(i*g-c*d)/(i*e-c↑2)
365 LET a=c/i-d/i*b
370 PRINT "The linear regressi
on equation:"
380 PRINT INK,RND*5;"Y=";a; ("+"
AND SGN b>-1); ("-" AND SGN b<0)
;ABS b;" X"
390 IF INKEY$="" THEN GO TO 390
400 GO SUB 31
410 CLS
420 PRINT "Interpolation/Extrap
olation 999 to end"
430 PRINT " X Y"
440 INPUT x
450 IF x=999 THEN GO TO 490
460 LET y=a+b*x
470 PRINT x;TAB 10;y
480 GO TO 440
490 GO SUB 31
500 INPUT INK 2; FLASH 1;"Anoth
er run ? ";a$
510 IF a$(1)<>"n" THEN RUN

```

COMBINATIONS AND PERMUTATIONS

This program, by Said Hassan, calculates combinations and permutations. You are asked which calculation you want to perform.

Lines 300-400 check that the input figures are numerical and lie within the machine's capabilities. The permutation of taking n different items, r at a time, is given by the formula:

$$nPr = \frac{n!}{(n-r)!}$$

For example, consider five different playing cards that have to be arranged in groups of three. ($n=5$, $r=3$, and $5P3=60$).

The combination of taking n items, r at a time, is given by the formula:

$$nC_r = \frac{n!}{(n-r)!r!}$$

How many ways can three book titles be selected from five book titles?

$$5C_3 = 10$$

```

10 PRINT INK,RND*5; FLASH 1;"
C' Combinations";"P' Permutatio
ns"
20 LET a$=INKEY$
30 IF a$="" OR a$<>"P" AND a$<
>"C" THEN GO TO 20
40 PRINT INK 1; FLASH 1;"Ente
r N"
50 GO SUB 300: LET n=VAL n$
70 PRINT INK 2; FLASH 1;"Enter
R"
80 GO SUB 300: LET r=VAL r$
90 IF r<=n THEN GO TO 120

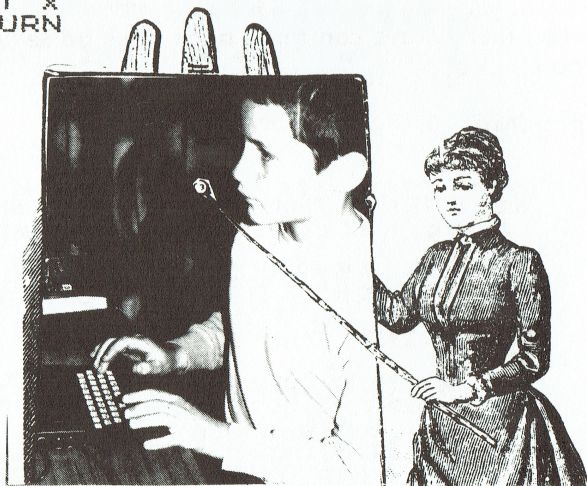
```



```

100 PRINT " INK RND*5; FLASH 1;
"TOO HIGH"
110 GO TO 70
120 PRINT " INK RND*5;"Calcula
ting"
130 LET z=n
135 GO SUB 410
140 LET b=a: LET z=n-r
150 GO SUB 410
155 LET c=a
160 IF a$="p" THEN GO TO 195
170 LET z=r
180 GO SUB 410
190 LET c=c*a
195 CLS
200 PRINT INK RND*5;n;" ";a$;"
";r;" = ";b/c
210 IF INKEY$="" THEN GO TO 210
220 CLS : RUN
300 INPUT n$
310 IF n$="" THEN GO TO 300
320 CLS
330 FOR x=1 TO LEN n$
340 IF (n$(x)>="0" AND n$(x)<="
9") THEN GO TO 370
350 PRINT INK RND*5;"Error "; F
LASH 1;"RE-ENTER"
360 GO TO 300
370 NEXT x
380 IF VAL n$<34 THEN RETURN
390 PRINT INK RND*5;"Too high "
; FLASH 1;"RE-ENTER"
400 GO TO 300
410 LET a=1
420 FOR x=1 TO z
430 LET a=a*x
440 NEXT x
450 RETURN

```



PRIME NUMBERS

This program, as the title suggests, generates prime numbers. When you run the program you will get a prompt. This is the number of prime numbers you want the computer to generate for you. It will then proceed to generate the numbers, printing them as it works them out. If you want a permanent record of your Spectrum in its prime(!), change line 110 to read LPRINT d,.

```

10 LET x=1: LET y=2: LET d=3
20 INPUT INK 2; FLASH 1;"How m
any primes ?";a
30 PRINT INK 2; FLASH 1;a;" pr
imes"; FLASH 0;1,2,3,
40 FOR b=x TO a-d
50 LET d=d+y: LET c=y+x
60 LET e=INT (d/c): LET f=d-e*
c
70 IF f=0 THEN GO TO 50
80 IF c>=e THEN GO TO 110
90 LET c=c+y
100 GO TO 60
110 PRINT INK RND*5;d,
120 NEXT b

```

SIMULTANEOUS EQUATIONS

This program, by Paul Stevens, solves simultaneous equations in the form:

$$aX + bY = e$$

$$cX + dY = f$$

When you run the program you are asked to enter the values of the constants. The program will then determine the values of X and Y.

```

5 REM Simultaneous Equations
6 REM by Paul Stevens
10 PRINT AT 0,0;"Simultaneous
Equations"

```



```

20 PRINT AT 0,0; OVER 1; INK R
ND*5; "
30 PRINT INK RND*5; "'AX+BY=E"
"CX+DY=F"
40 INPUT INK 1; FLASH 1;"A=";a
INK 1; FLASH 1;"B=";b; INK 1;
FLASH 1;"E=";e
50 INPUT INK 2; FLASH 1;"C=";c
INK 2; FLASH 1;"D=";d; INK 2;
FLASH 1;"F=";f
60 LET g=(c*b)-(d*a)
70 LET h=(-d*e)+(b*f)
80 LET i=(c*e)+(-a*f)
90 LET x=h/g; LET y=i/g
100 PRINT " " INK RND*5;a;"X+";b
"Y=";e
110 PRINT " " INK RND*5;c;"X+";d
"Y=";f
120 PRINT " " INK 1;"Answer is
"; FLASH 1;"X=";x
130 PRINT TAB 10; FLASH 1;"Y=";
y
140 INPUT INK 2; FLASH 1;"Again
? ";a$
150 IF a$(1)="y" THEN RUN

```

Simultaneous Equations

AX+BY=E
CX+DY=F

2X+3Y=14

5X+9Y=38

Answer is X=4
Y=2

EQUATION SOLVER

This routine, written by Jeremy Ruston, uses Newton's method for solving equations. Enter the equation you want solved for X, when prompted by 'Enter a function', then in reply to 'Enter a starting point' — enter a starting position for the computer to work from. This should be an answer somewhere near what you believe the correct answer to be, or — if there is more than one correct answer — a number near the answer you are seeking. Then press ENTER and watch as the computer verges towards the answer.

To try it out, enter $X * X - 5$ (to find the square root of 5) or $X \rightarrow 3 - 27.6$ to find the cube root of 27.6.

```

1 REM Newtons method for
  solving equations
2 REM by Jeremy Rushton
10 INPUT INK 2; FLASH 1;"Enter
a function "; LINE f$
20 PRINT INK RND*5;"Function:"
;f$
30 INPUT INK 1; FLASH 1;"Enter
a starting point ";s
40 PRINT INK RND*5;"Starting p
oint: ";s
50 INPUT INK 3; FLASH 1;"Enter
maximum error ";err
60 PRINT INK RND*5;"Maximum er
ror: ";err
70 PRINT AT 10,10; INK 1;"X=";
s
80 LET x=s
90 IF ABS (VAL (f$))<err THEN
STOP
100 LET t=VAL f$: LET x=x+.0000
1
150 LET b=(VAL (f$)-t)/0.00001
160 LET s=s-t/b
170 GO TO 70

```


PLOTTING AND DRAWING

The next few programs demonstrate the Spectrum's plotting and drawing ability. The first program draws a series of circles, using the circle command to create a cone. Try changing t , a and b — and see what happens.

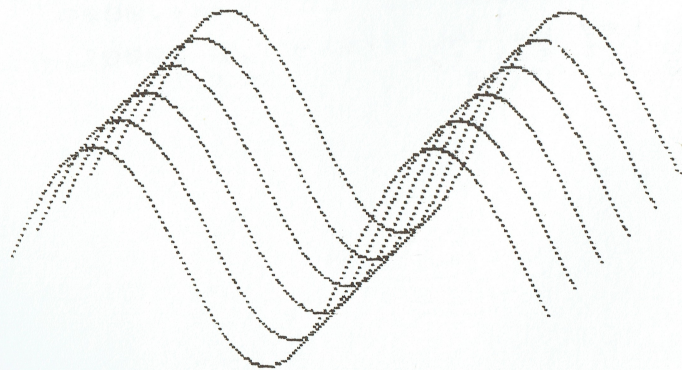
The second program draws lines, of random length, in random colours, from the four corners.

The third program draws a straight line curve. You type in the ink colour and the thickness and your Spectrum does the rest.

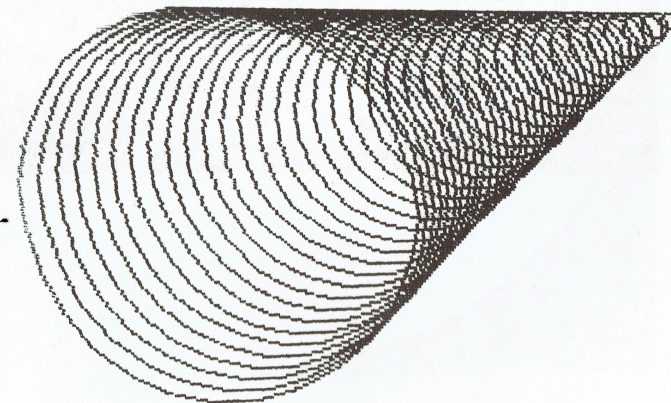
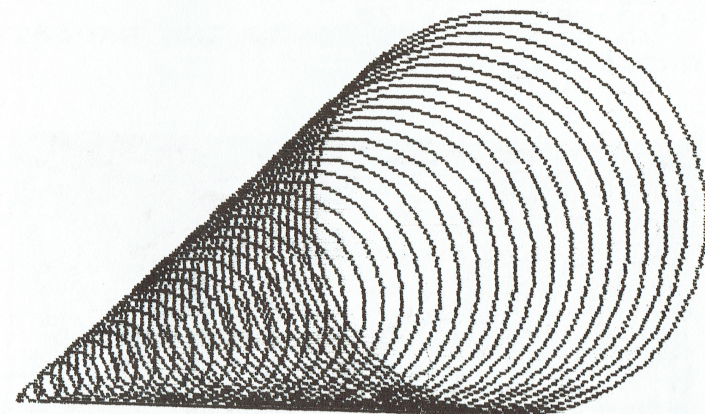
The fourth program draws a series of sine curves, which are plotted to produce the result as shown in the sample run, then unplotted, curve by curve, to leave a blank screen. Try changing the stepsize and the values 20 and 40 in lines 40 and 50.

The fifth program plots any graph after entering an equation at line 10.

The sixth program draws circles, at different co-ordinates, and starting and finishing points, which enables you to get overlapping solid circles as in the sample run.



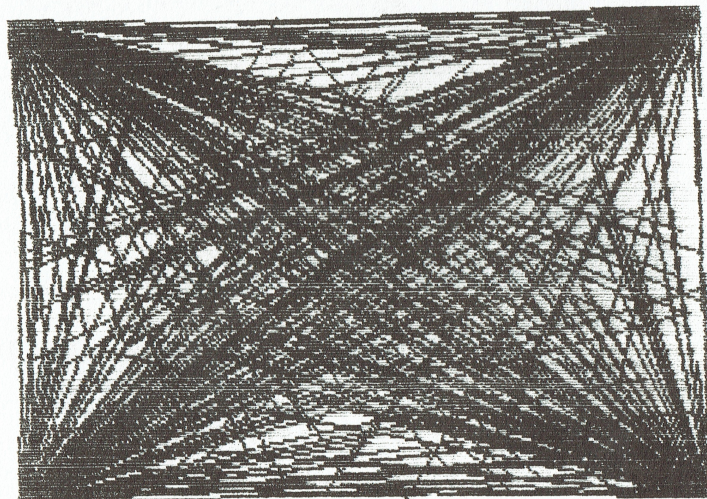
```
1 BORDER RND#6: PAPER RND#6:
INK 9: CLS
10 LET a=1: LET b=1
20 FOR t=1 TO 185 STEP 5
30 CIRCLE t,a,b
40 LET a=a+2: LET b=b+2
50 NEXT t
```




```

10 PLOT 0,0: DRAW INK RND*6;RN
D*255,RND*175
20 PLOT 255,175: DRAW INK RND*
6;-RND*255,-RND*175
30 PLOT 255,0: DRAW INK RND*6;
-RND*255,RND*175
40 PLOT 0,175: DRAW INK RND*6;
RND*255,-RND*175
60 GO TO 10

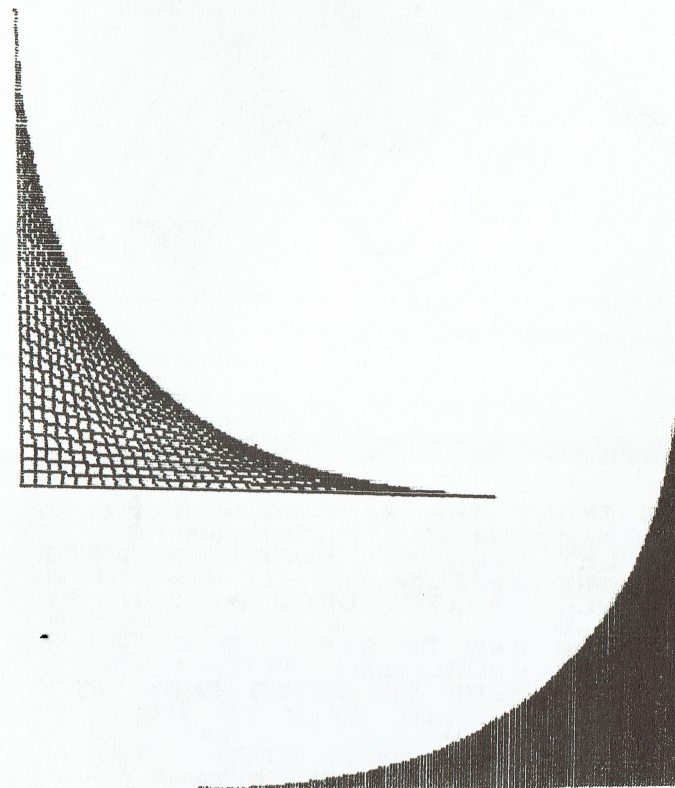
```



```

10 INPUT "Ink Colour ? ";c
20 BORDER 7: PAPER 7: INK c: C
L5
30 INPUT "Type in number from
1-25 (1 is fine,25 thick) ";b
40 LET a=0
50 PLOT 0,175: DRAW 0,-175
60 PLOT 0,0: DRAW 175,0
70 FOR t=175 TO 0 STEP -b
80 PLOT 0,t: DRAW a,-t
90 LET a=a+b
100 NEXT t

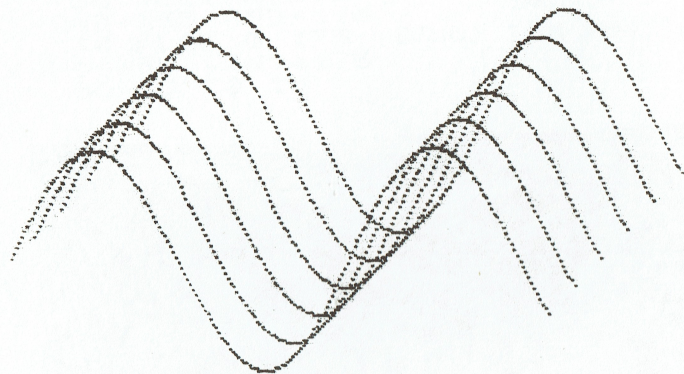
```




```

10 LET x=AND*5: PAPER x: INK 9
BORDER x: CLS
15 FOR d=1 TO 2
20 FOR a=0 TO 50 STEP 10
30 FOR x=0 TO 10 STEP .05
40 IF d=1 THEN PLOT 20*x+a,40*
SIN x+40*a
50 IF d=2 THEN PLOT OVER 1;20*
x+a,40*SIN x+40*a
60 NEXT x: NEXT a: NEXT d

```



```

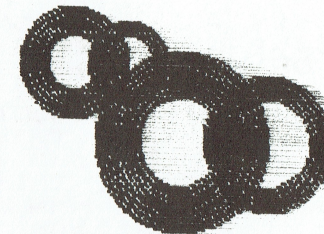
10 INPUT INK 2: "Please type in
function of X ": LINE a$
15 LET c=AND*5: PAPER c: BORDE
R c: INK 9: CLS
20 PLOT 0,175: DRAW 0,-175: DR
AW 255,0
30 FOR x=0 TO 255
40 LET y=VAL a$
50 IF x>255 OR y>175 THEN GO T
O 60
60 PLOT x,y
70 NEXT x
80 PRINT AT 19,10: FLASH 1: "Y=
": a$

```

```

1 REM circle draw
10 INPUT "x co-ordinate ?";x:
INPUT "y co-ordinate ?";y
15 INPUT "Start ( first radius
) ?";s
20 INPUT "Finish ( Final radiu
s ) ?";f
30 INPUT "Colour ";c
40 FOR z=s TO f
50 CIRCLE INK c;x,y,z
60 NEXT z
70 GO TO 10

```



SHADE

SHADE produces an ever-evolving pattern, by printing a blue square if it comes to a black square and a black square if it comes to a blue square.

```

1 REM Shade by D Harwood
5 FOR t=0 TO 21
6 PRINT "
7 NEXT t
10 LET a$="■"
20 LET z=AND*21: LET a=AND*21:
LET b=AND*31
30 IF ABS (z-b)>=21 THEN LET z
=b-10
40 FOR t=0 TO b
50 LET d=0
60 LET p=ATTR (a,t)
70 IF p=56 THEN LET d=1
80 PRINT AT a,t: INK d;a$
90 LET d=0
100 LET p=ATTR (ABS (z-t),b-1)
110 IF p=56 THEN LET d=1
120 PRINT AT ABS (z-t),b-1: INK
d;a$
130 NEXT t
140 GO TO 20

```


ETCHASKETCH

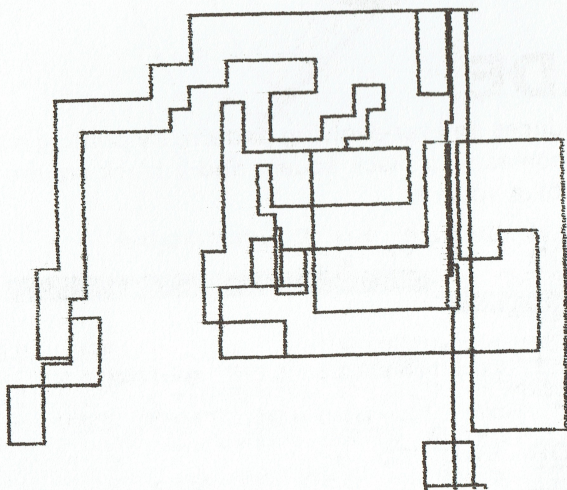
This little program allows you to use the '5', '6', '7' and '8' keys to move a fine line around the screen, drawing pictures of your choice.

When running, the line will continue to move unless you press another key.

```

1 LET a$="": LET a=127: LET b
=87
10 IF INKEY$<>"" THEN LET a$=I
NKEY$
20 LET b=b+(a$="7")-(a$="6")
30 LET a=a+(a$="8")-(a$="5")
40 IF a=255 OR a=0 THEN LET a=
ABS (a-255)
50 IF b=176 OR b=0 THEN LET b=
ABS (b-175)
60 PLOT a,b: GO TO 10

```



COLOUR SKETCHPAD

COLOUR SKETCHPAD enables you to draw some great pictures on the screen. You control your direction using the keys '5' to '8'. You change your character by pressing 'H' and then typing in the new character. You change the ink colour by pressing C and then typing in the new ink colour. You can make it flash if you press 'F', and stop it flashing if you press 'N'.

```

10 REM Colour Sketchpad
20 REM by D Harwood
30 PRINT INK 1;TAB 6;"Colour S
ketchpad"
40 PRINT " INK RND*5;"Move us
ing the cursor controls"
50 PRINT " INK RND*5;"If you
want to change colour"
60 PRINT INK RND*5;"press "; I
NK 2; FLASH 1;"C"; INK RND*5; FL
ASH 0;" and then the colour code"
70 PRINT " INK RND*5;"If you
want to change the"
80 PRINT INK RND*5;"character,
press "; INK 2; FLASH 1;"H"; IN
K RND*5; FLASH 0;" and then the
character"
85 PRINT " INK RND*5;"If you
want it flashing press"
86 PRINT INK 2; FLASH 1;"F"; I
NK RND*5; FLASH 0;" (to turn fla
sh off press "; INK 2; FLASH 1;"
N"; FLASH 0;)"
90 PRINT " INK 1; FLASH 1;"PR
ESS ANY KEY TO CONTINUE"
100 PAUSE 10000: CLS
110 LET x=10: LET y=10: LET b=0
120 LET c=2: LET h$="■"
130 PRINT AT x,y; INK c; FLASH
b;h$
140 LET y=y+(INKEY$="8")-(INKEY
$="5")
145 IF y=-1 THEN LET y=0
146 IF y=32 THEN LET y=31
150 LET x=x+(INKEY$="6")-(INKEY
$="7")
155 IF x=-1 THEN LET x=0
156 IF x=32 THEN LET x=21
160 IF INKEY$="c" THEN GO SUB 2
00
170 IF INKEY$="h" THEN GO SUB 3
00

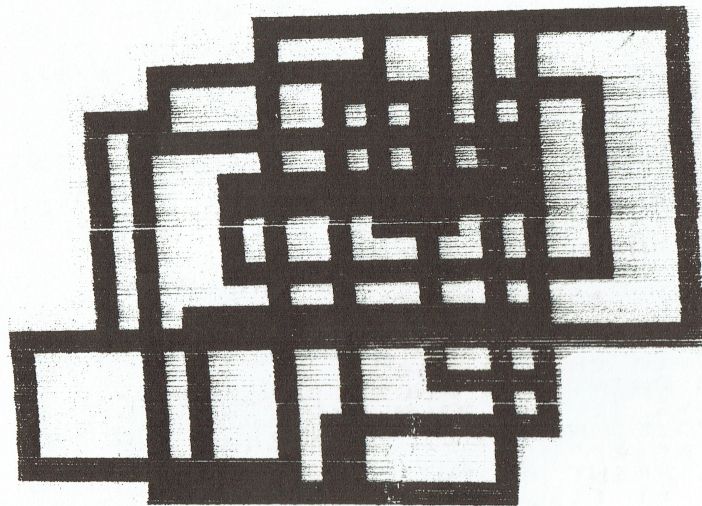
```



```

175 IF INKEY$="f" THEN LET b=1
177 IF INKEY$="n" THEN LET b=0
180 GO TO 130
200 INPUT "Type in new colour "
:c
210 RETURN
300 INPUT "Type in new character "
:h$
310 RETURN

```



WORDSQUARE

In this program, you enter a number of words which the computer then hides on a grid, whose dimensions depend upon the length of the longest word in the list. If you find the task of trying to discover where each word is hiding too difficult, the computer will pick them out for you, in inverse colour.

The longest word in the list should have no more than 18 letters or the grid will not fit onto the screen. About 20 words of varying length can be fitted in about 5-10 minutes. A longer list of words can result in a very frustrating wait.

It is a good idea to enter the words in descending order of length as this will speed it up. The program is fascinating to watch in operation.

```

1 REM Wordsquare
2 REM By J Elliott
5 BORDER RND*6: PAPER RND*6:
INK 9: CLS
10 PRINT "If you do not wish t
o see the"
20 PRINT "answers then enter "
: FLASH 1; "n"; FLASH 0; ""
30 PRINT "now. Otherwise press
any key."
50 LET r$=INKEY$: IF r$="" THE
N GO TO 50
60 CLS
65 POKE 23692,-1
70 PRINT AT 0,10;"WORDSQUARE";
AT 0,10; OVER 1; ""
80 INPUT "How many words? ";a
90 INPUT "Enter longest word";
b$
100 DIM c$(a,LEN b$)
110 LET c$(1)=b$
120 FOR c=2 TO a
130 INPUT ("enter word number "
:c);d$
140 IF LEN d$>LEN b$ THEN PRINT
AT 20,0; FLASH 1;"INVALID WORD
LENGTH"; GO TO 130
150 LET c$(c)=d$
190 NEXT c
195 REM Next line contains 22 s
paces
200 PRINT AT 19,0;""
210 LET d=LEN b$+2
220 FOR e=1 TO d: FOR f=1 TO d
230 PRINT AT e,f;"*"
240 NEXT f: NEXT e
250 DIM h$(d,d)
260 FOR q=1 TO a
270 LET j#=c$(q)
280 PRINT AT 19,0;j$
310 LET x=INT (RND*d)+1: LET y=
INT (RND*d)+1
320 LET z=INT (RND*3): LET w=IN
T (RND*3)
330 IF z=0 AND w=0 THEN GO TO 3
20
360 IF z=2 THEN LET z=-1
370 IF w=2 THEN LET w=-1
380 DIM k(LEN j$,2)
390 FOR l=1 TO LEN j$
400 IF j$(l)="" THEN GO TO 450
410 LET x=x+z: LET y=y+w

```



```

430 IF x<1 OR x>d OR y<1 OR y>d
THEN GO TO 270
440 IF (NOT h$(x,y)=" ") AND (NOT
h$(x,y)=j$(l)) THEN GO TO 2
70
445 LET k(l,1)=x: LET k(l,2)=y
450 PRINT AT 19,l-1; INVERSE 1;
INK 9; j$(l)
460 NEXT l
470 FOR m=1 TO LEN j$
480 IF j$(m)=" " THEN GO TO 500
485 LET h$(k(m,1),k(m,2))=j$(m)
490 IF r$="n" THEN GO TO 500
495 BEEP .01,RND*10-RND*20: PRI
NT AT k(m,1),k(m,2); j$(m)
500 NEXT m: NEXT q
510 REM 15 spaces in the next l
ine
520 PRINT AT 19,0;"
"
530 FOR n=1 TO d: FOR p=1 TO d
535 BEEP .01,RND*10-RND*20
540 IF NOT h$(n,p)=" " THEN GO
TO 565
550 LET p$=CHR$(INT (RND*26)+9
7)
560 PRINT AT n,p;p$: GO TO 570
565 PRINT AT n,p;h$(n,p)
570 NEXT p: NEXT n
580 PRINT AT 19,10; FLASH 1;"Fi
nished"
590 PRINT AT 20,0; FLASH 1;"Pre
ss any key for answers"
600 LET q$=INKEY$: IF q$="" THE
N GO TO 600
610 FOR n=1 TO d: FOR p=1 TO d
620 IF h$(n,p)=" " THEN GO TO 6
40
630 PRINT AT n,p; INVERSE 1; IN
K 9;h$(n,p)
640 NEXT p: NEXT n
650 PRINT AT 19,10;"
"

```

Finished
Press any key for answers

WORD SQUARE

a	c	a	m	b	r	i	d	a	e	j
e	p	r	o	g	r	a	m	p	c	s
m	u	r	t	c	e	p	s	j	a	l
c	s	j	r	t	s	r	i	t	r	s
o	r	i	y	a	b	i	t	b	r	m
n	z	b	n	e	m	e	n	f	e	e
e	d	a	g	c	p	p	p	a	t	m
c	s	k	s	u	l	t	a	j	n	o
t	y	g	d	c	d	a	a	c	i	r
o	w	p	a	p	e	r	i	m	k	y
r	p	r	i	n	t	e	r	r	i	o

ac
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ce
co
da
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di
do
dr
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ed
ee
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er
es
et
ex
fa
fe
fi
fo
fr
fu
ga
ge
gi
go
gr
gu
ha
he
hi
ho
hr
hu
ja
je
ji
jo
jr
ju
ka
ke
ki
ko
kr
ku
la
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ne
ni
no
nr
nu
pa
pe
pi
po
pr
pu
ra
re
ri
ro
rr
ru
sa
se
si
so
sr
su
ta
te
ti
to
tr
tu
va
ve
vi
vo
vr
vu
wa
we
wi
wo
wr
wu
ya
ye
yi
yo
yr
yu
za
ze
zi
zo
zr
zu

Finished
Press any key for answers

WORD SQUARE

a	c	a	m	b	r	i	d	a	e	j
e	p	r	o	g	r	a	m	p	c	s
m	u	r	t	c	e	p	s	j	a	l
c	s	j	r	t	s	r	i	t	r	s
o	r	i	y	a	b	i	t	b	r	m
n	z	b	n	e	m	e	n	f	e	e
e	d	a	g	c	p	p	p	a	t	m
c	s	k	s	u	l	t	a	j	n	o
t	y	g	d	c	d	a	a	c	i	r
o	w	p	a	p	e	r	i	m	k	y
r	p	r	i	n	t	e	r	r	i	o

ac
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WALLPAPER

This program, written by Mark Charlton, takes your name (or any string of up to 16 letters long that you enter), and produces a colourful wallpaper pattern.

```

10 REM Wallpaper
20 REM © M Charlton
30 INPUT "Enter your name";a$
40 LET a$=a$+" "
45 IF LEN a$<16 THEN GO TO 40
47 LET a$=a$(1 TO 16)
48 LET b$=a$
50 BORDER 7: PAPER 7: CLS
90 FOR h=1 TO 16
100 FOR a=-16 TO 16
145 IF a=0 THEN GO TO 160
150 PRINT INK (h/3);a$(ABS a);
160 NEXT a
180 LET a$=a$(2 TO )+a$(1)
190 NEXT h
195 POKE 23692,-1
200 GO TO 90

```

```

C kram notlrahharlton Mark C
hC kram notlraarlton Mark Ch
ahC kram notlrrlton Mark Cha
rahC kram notlllton Mark Char
lrahC kram notton Mark Charl
tlrahC kram noon Mark Charlt
otlrahC kram nn Mark Charlto
notlrahC kram Mark Charlton
notlrahC kram Mark Charlton
notlrahC kramMark Charlton
M notlrahC kraark Charlton M
aM notlrahC krrk Charlton Ma
raM notlrahC kk Charlton Mar
kram notlrahC Charlton Mark
kram notlrahCCharlton Mark
C kram notlrahharlton Mark C
hC kram notlraarlton Mark Ch
ahC kram notlrrlton Mark Cha
rahC kram notlllton Mark Char
lrahC kram notton Mark Charl
tlrahC kram noon Mark Charlt

```

ANAGRAMS

ANAGRAMS by Ken Mahogany shows the flexibility of the Spectrum's string handling. When you run the program, you enter a word (such as your first name) and the computer will produce every conceivable combination of the letters in your name. The sample run shows some anagrams of the programmer's name.

```

10 REM Anagrams
20 REM ©K Mahogany
30 INPUT INK 2;"Enter your wor
d ";LINE a$
35 POKE 23692,-1
40 LET n=LEN a$: DIM a(n)
45 FOR x=1 TO 7
50 LET a(1)=INT (RND*n)+1
60 FOR z=2 TO n
70 LET a(z)=INT (RND*n)+1
80 FOR j=1 TO z-1
90 IF a(j)=a(z) THEN GO TO 70
100 NEXT j: NEXT z
110 LET b$=""
120 FOR b=1 TO n
130 LET b$=b$+a$(a(b))
140 NEXT b
150 PRINT TAB 4; PAPER x; INK 9
b$
160 NEXT x
170 GO TO 45

```

```

Maghnyao
ayMagnho
aaonyghM
omnhayga
ghaayomn
eahygomn
ghnaMyoa
yahMnoga
hoynMaga
Maygoahn
aognhyMa
ngoayaMh
aoMnghya
gayonaMh
Mahoyagn
yaaonhgm
ohMaayng
ahaMgony
nagaoyMh
ahnMyoga
nahMygao

```


FIGHTER

You are the pilot of a defender jet. You must line up the alien spaceship in your sights, using the '5', '6', '7' and '8' keys, moving in the direction of the arrows on those keys. You destroy it by pressing 'F'. The alien spaceship does not just sit there waiting for you to destroy it. You have to cope with its somewhat random evasive movements. Since you can only control your own 'plane, the alien craft will appear to move in the direction opposite to the one you press.

The game, as listed, is at the beginner's level. The speed is increased if you remove line 150, the time display. FIGHTER was written by Paul Toland.

```

1 REM run lines 2-4 before ty
ping in rest of program
2 FOR t=0 TO 7: READ a
3 POKE USR "a"+t,a: NEXT t
4 DATA 24,60,126,255,126,90,1
53,24
10 LET t=0
20 LET x=INT (RND*32): LET y=I
NT (RND*22)
30 PRINT AT 10,14: INK 1: FLAS
H 1:">"
40 IF t<>INT (t/2)*2 THEN GO T
O 30
50 IF x>-1 AND x<32 AND y>-1 A
ND y<22 THEN PRINT AT y,x:
60 LET y=y+INT (RND*3)-1
70 LET x=x+INT (RND*3)-1
80 LET a$=INKEY$
85 IF x>-1 AND x<32 AND y>-1 A
ND y<22 THEN PRINT AT y,x:
90 LET x=x+(a$="5")-(a$="8")
100 LET y=y+(a$="7")-(a$="6")
115 REM to get a type in 'a' in
graphics mode
120 IF x>-1 AND x<32 AND y>-1 A
ND y<22 THEN PRINT AT y,x:
130 IF a$="f" THEN BEEP .01,0
140 IF a$="f" AND x=15 AND y=10
THEN GO TO 170
150 LET t=t+1: PRINT AT 0,0: IN
K 2:t
160 GO TO 30
170 FOR v=1 TO 10

```

```

180 PRINT AT 10,15: "■": BEEP .0
1,-10-v
190 PRINT AT 10,15: " ": BEEP .0
1,v
200 BORDER RND*7
210 NEXT v
220 PRINT AT 18,0: INK 2: "You g
ot it in ";t;" seconds."
230 PRINT FLASH 1: "Would you
like to try again?"
240 IF INKEY$="" THEN GO TO 240
250 IF INKEY$="y" THEN CLS : RU
N

```

HIGHER/LOWER

HIGHER/LOWER is a simple game where you predict whether the next card will be higher or lower than the present card. If you predict wrongly, 10 points are knocked off your score. If you are correct, then 10 points are added to your score.

```

1 REM Higher/Lower
2 REM by D Harwood
10 LET p=100: POKE 23692,-1
20 PRINT AT 21,0: INK RND*5: "H
igher Lower": OVER 1; AT 21,0:
30 PRINT " INK RND*5: "I will
give you a number and you must sa
y whether the next number will be
higher or lower"
40 INPUT INK 1: FLASH 1: "Enter
range of values for "numbers";
a: INK 1: FLASH 1: " to "; b
50 LET x=INT (RND*b+a)
55 PRINT " INK 1: FLASH 1: "Yo
u have ";p;" points"
57 IF p=0 THEN GO TO 190
60 PRINT " INK RND*5: "Number i
s ";x
70 INPUT "Do you think the nex
t number will be higher or lo
wer" INK 1: FLASH 1: "(H-higher
L-lower)"; a$
80 LET y=INT (RND*b+a)
90 IF x<=y THEN LET b$="Higher
100 IF x>=y THEN LET b$="Lower"
110 IF a$="h" AND x<=y OR a$="l
" AND x>=y THEN GO TO 150
120 PRINT INK RND*5: "Wrong, the
next number was " FLASH 1: b$

```


COLOURMIND

This program is based on Mastermind (Mastermind is a registered trademark of Invicta), where the computer chooses four random colours and you have to guess these colours. When asked to type in your guess, enter the number corresponding to the colour you want. You will then be told how many you have guessed in the right position (black) and how many you have guessed correctly but in the wrong position (white).

No colour is repeated within the four chosen.

```

2 REM by D Harwood
4 DIM a(4): DIM b(4)
5 LET g=1
6 LET a$=CHR$(8+CHR$(8+CHR$(8+CHR$(8
+CHR$(8+CHR$(8+CHR$(8+CHR$(8+CHR$(8
$ 8+CHR$(8+CHR$(8+CHR$(8
7 POKE 23692,255
10 OVER 1: PRINT AT 21,8;"Master
Mind";
20 PRINT a$;"_____";
30 PRINT "I will choose 4 c
olours. You"
40 PRINT "must guess these col
ours within"
50 PRINT "20 tries."
60 PRINT "Type any key to con
tinue."
70 PAUSE 10000
80 FOR t=1 TO 4
90 LET a(t)=INT (RND*8)
95 IF a(t)=a(1) AND t<>1 OR a(
t)=a(2) AND t<>2 OR a(t)=a(3) AN
D t<>3 OR a(t)=a(4) AND t<>4 THE
N GO TO 90
100 NEXT t
110 CLS
120 LET s=0: LET r=0: INPUT ("T
ype in guess ";g); g$
130 LET b(1)=VAL g$(1): LET b(2
)=VAL g$(2)
135 LET b(3)=VAL g$(3): LET b(4
)=VAL g$(4)
140 PRINT " INK b(1); "█"; INK
b(2); "█"; INK b(3); "█"; INK b(
4); "█";
150 LET g=g+1
160 FOR t=1 TO 4: FOR i=1 TO 4
170 IF a(t)=b(i) AND t<>i THEN
LET s=s+1

```

```

180 NEXT i: NEXT t
190 FOR t=1 TO 4
200 IF b(t)=a(t) THEN LET r=r+1
210 NEXT t
220 PRINT "  █black-";r;"  wh
ite- ";s
230 IF r=4 THEN GO TO 260
240 IF g=20 THEN GO TO 270
250 GO TO 120
260 CLS: PRINT AT 11,0; FLASH
1; INK 4;"Well done. You guessed
the colour": GO TO 280
270 PRINT AT 11,0; INK 4;"Bad l
uck. You took more than 20 guess
es"
280 PRINT AT 13,0; FLASH 1; INK
a(1); "█"; INK a(2); "█"; INK a
(3); "█"; INK a(4); "█";
290 FOR g=1 TO 20: BEEP .2,RND*
20: NEXT g

```

CHECKERS

This checkers program, by Tim Hartnell, plays quite a good game.

You enter your move by typing in the letter at the bottom of the square which is on the line on which your piece is sitting, then the number along the right hand side, then press ENTER. You then do the same for the square into which you want to move.

The computer makes its multiple jumps automatically. After you make a capture, you'll be asked if you can jump again. If you can, press any key, then ENTER, and you'll be offered a new move. If not, just press ENTER and the computer will make its move.

There are three way the game can end. The computer will either concede defeat, even if there are still possible moves, if it judges the situation is hopeless; or it will claim victory on capturing all your pieces; or it will give you the game when you capture all of its pieces. You'll find that although the computer plays fairly slowly at the start of the game, it picks up speed to some extent as it progresses.

My score is 0, and yours is 0

```

+ + + + + 1
+ + + + + 2
+ + + + + 3
+ + + + + 4
+ + + + + 5
+ + + + + 6
+ + + + + 7
+ + + + + 8
+ + + + + 9
ABCDEFGH

```

```

10 REM *****
20 REM *CHECKERS*
30 REM *By Tim Martinell*
40 REM *****
50 GO SUB 940
60 LET Z=24
70 LET Q=0
80 REM *Make human kings**
90 FOR G=69 TO 72: IF A(G)=-1
THEN LET A(G)=-2
100 NEXT G
110 GO SUB 720
120 REM *Spectrum looks
    for captures*
130 IF A(Z)=99 OR A(Z)<1 THEN G
O TO 220
140 IF Z<28 AND A(Z)=1 THEN LET
A(Z)=2
150 LET Y=1
160 IF A(Z+X(Y))<0 AND A(Z+2*(X
(Y)))=0 THEN LET Q=X(Y)
170 IF A(Z)=2 AND A(Z-X(Y))<0 A
ND A(Z-2*(X(Y)))=0 THEN LET Q=-X(Y)
180 IF Q<>0 AND Z+2*Q>23 THEN G
O TO 250
190 LET Q=0
200 IF Y=2 THEN GO TO 220
210 LET Y=2: GO TO 160
220 LET Z=Z+1
230 IF Z<73 THEN GO TO 130
240 IF Q=0 THEN GO TO 340
250 LET A(Z+Q)=0: LET A(Z+2*Q)=
A(Z): LET A(Z)=0
260 LET Z=Z+2*Q: LET COM=COM+1:
GO SUB 720
270 LET Q=0: LET Y=1
280 IF A(Z+X(Y))<0 AND A(Z+2*(X
(Y)))=0 THEN LET Q=X(Y)
290 IF A(Z)=2 AND A(Z-X(Y))<0 A
ND A(Z-2*(X(Y)))=0 THEN LET Q=-X(Y)
300 IF Q<>0 AND Z+2*Q>23 THEN G
O TO 250

```

```

310 IF Y=1 THEN LET Y=2: GO TO
250
320 GO TO 480
330 REM *Computer looks for
    non-capture*
340 LET U=0
350 LET Z=24+INT (AND*49): LET
U=U+1
360 IF A(Z)=1 OR A(Z)=2 THEN GO
TO 380
370 GO TO 350
380 LET Y=1
390 IF A(Z+X(Y))=0 AND (A(Z+2*(X
(Y)))>-1 AND A(Z+2*(X(Y)+1))>-1 AND
A(Z+2*(X(Y)-1))>-1) THEN LET Q=X(
Y)
395 IF A(Z+X(Y))=0 AND U>250 TH
EN LET Q=X(Y)
400 IF A(Z)=2 AND A(Z-X(Y))=0 A
ND (A(Z-2*(X(Y)))>-1 AND A(Z-2*(X(Y)
)+1)>-1 AND A(Z-2*(X(Y)-1))>-1 OR
U>600) THEN LET Q=-X(Y)
410 IF Q<>0 THEN GO TO 450
420 IF Y=1 THEN LET Y=2: GO TO
390
430 IF U<1000 THEN GO TO 350
440 PRINT INK 2; FLASH 1;"I con
cede the game!": STOP
450 LET A(Z+Q)=A(Z): LET A(Z)=0
470 GO SUB 720
480 PRINT "TAB 6; INK 2;"Ente
r your move"
490 PRINT TAB 5; INK 2;"as A9 t
hen ENTER,"
500 PRINT TAB 4; INK 2;"then B8
then ENTER."
510 BEEP .2,RND*10
520 INPUT FLASH 1,"From? ";A$:
BEEP .2,RND*10: INPUT FLASH 1,"T
o? ";B$: FOR W=1 TO 2: LET Z=0
525 PRINT AT 15,0;"

```

```

530 IF U=1 THEN LET C$=A$
540 IF U=2 THEN LET C$=B$
550 LET Z=-24*(C$="G9")-25*(C$=
"E9")-26*(C$="C9")-27*(C$="A9")-
30*(C$="H8")-31*(C$="F8")-32*(C$=
"D8")-33*(C$="B8")-37*(C$="G7")-
38*(C$="E7")-39*(C$="C7")-40*(C
$="A7")-43*(C$="H6")-44*(C$="F6")-
45*(C$="D6")-46*(C$="B6")-50*(C
$="G4")
560 IF Z<>0 THEN GO TO 580
570 LET Z=-51*(C$="E4")-52*(C$=
"C4")-52*(C$="A4")-56*(C$="H3")-
57*(C$="F3")-58*(C$="D3")-59*(C$

```



```

="B3")-63*(C$="G2")-64*(C$="E2")
-65*(C$="C2")-66*(C$="A2")-69*(C
$="H1")-70*(C$="F1")-71*(C$="D1"
)-72*(C$="B1")
580 IF U=1 THEN LET D=-Z
590 IF U=2 THEN LET E=-Z
600 NEXT U
620 LET A(E)=A(D)
630 LET A(D)=0
650 IF ABS (D-E)>7 THEN LET A(D
+(INT (E-D)/2))=0: LET HUM=HUM+1
670 GO SUB 720
680 IF ABS (D-E)>7 THEN INPUT ;
FLASH 1;"Can you jump again?
Press any key, then ENTER for YE
S)";U$: IF U$<>"" THEN GO TO 520
690 IF HUM<12 AND COM<12 THEN G
O TO 60
700 IF HUM=12 THEN PRINT FLASH
1; BRIGHT 1; INK 2; PAPER 6;"You
win, human!": STOP
710 IF com=12 THEN PRINT FLASH
1; BRIGHT 1; INK 2; PAPER 6;"I h
ave beaten you!": STOP
740 FOR M=24 TO 72
750 LET A(M)=145*(A(M)=1)+147*(
A(M)=2)+32*(A(M)=0)+144*(A(M)=-1
)+146*(A(M)=-2)+99*(A(M)=99)
760 NEXT M
770 PRINT AT 1,0; INK AND#7; PA
PER 9;"My score is ";COM;" and
yours is ";HUM
780 PRINT AT 3,0;
790 LET T=-2: FOR K=0 TO 3: FOR
J=0 TO 3
800 PRINT INK 2;"■"; INK 1;CHR$(
A(72-J-13*K));
810 NEXT J: LET T=T+1
820 PRINT INK 6; PAPER 2;INT ((
J+K)/2)+T
830 FOR J=0 TO 3
840 PRINT INK 1;CHR$(A(66-J-13
*K)); INK 2;"■";
850 NEXT J: LET T=T+1
860 PRINT INK 6; PAPER 2;INT ((
J+K)/2)+T
870 NEXT K
880 PRINT INK 6; PAPER 2;"ABCDE
FGH"
890 FOR M=24 TO 72
900 LET A(M)=(A(M)=145)+2*(A(M)
=147)+0*(A(M)=32)-(A(M)=144)-2*(
A(M)=146)+99*(A(M)=99)
910 NEXT M
920 RETURN
930 REM *****
940 REM *Initialise variables*

```

```

950 DIM A(99): DIM X(2): LET X(
1)=-6: LET X(2)=-7
960 FOR Z=1 TO 99: LET A(Z)=99
970 IF Z<73 AND Z>55 AND NOT (Z
=67 OR Z=68 OR Z=60 OR Z=61 OR Z
=62) THEN LET A(Z)=1
980 IF Z<54 AND Z>42 AND NOT (Z
=47 OR Z=48 OR Z=49) THEN LET A(
Z)=0
990 IF Z<41 AND Z>23 AND NOT (Z
=34 OR Z=35 OR Z=36 OR Z=28 OR Z
=29) THEN LET A(Z)=-1
1000 NEXT Z
1010 LET COM=0
1020 LET HUM=0
1030 FOR J=0 TO 7
1040 READ A: READ B
1050 READ C: READ D
1060 POKE USA "A"+J,A
1070 POKE USA "B"+J,B
1080 POKE USA "C"+J,C
1090 POKE USA "D"+J,D
1100 NEXT J
1110 RETURN
1120 DATA 0,0,0,0,24,8,84,84
1130 DATA 60,20,124,124,126,42,1
24,84
1140 DATA 126,42,124,108,60,20,1
24,84
1150 DATA 24,8,254,170,0,0,0,0

```

RENUMBER

The last program is a very useful routine which will renumber line numbers, but not GOTOs and GOSUBs. Type in the routine starting from line 9990. This program allows you to pick the starting line number and the step size.

```

9990 REM renumber
9991 LET x=PEEK 23635+256*PEEK 2
3636
9992 INPUT "Starting number ";s
9993 INPUT "Step size ";d
9994 IF PEEK (x+1)+256*PEEK (x)=
9990 THEN STOP
9995 POKE x,INT (s/256)
9996 POKE x+1,s-256*INT (s/256)
9997 LET s=s+d
9998 LET x=4+x+PEEK (x+2)+256*PE
EK (x+3)
9999 GO TO 9994

```


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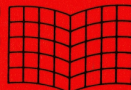
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